

The newswweekly of enterprise network computing

# NetworkWorld

**'99 SPENDING  
SURVEY**Network  
budgets  
climbed 10%.

Page 65.



January 24, 2000 Volume 17, Number 4

## NOS King of the Hill

◆ In our hands-on review of four network operating systems, Microsoft's Windows 2000 is the overall winner, but Novell's NetWare 5.1 is tops in performance. **Page 71.**

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THE BIG PIXEL

## Stanford move rekindles 'Net address debate

BY CAROLYN DUFFY  
MARSAN

Stanford University's on-going effort to conserve Internet address space by renumbering its campus network highlights two of the Internet engineering community's most hotly debated questions:

Exactly how severe is the shortage of Internet addresses? And are short-term measures

being ignored that might help stretch the supply until the next version of IP — IPv6 — provides a wealth of new addresses?

In April, Stanford will complete a labor-intensive two-year effort that involves reconfiguring all 56,000 computers and devices on its network to more efficiently use Internet address space. Afterward, See **IPv4**, page 104

PREVIEW

COMNET  
2000

### More coverage

**Inside:**

- **Aprisma, NetScout** to advance Web-based management. **Page 6.**
- Integrated access offering on the way from **MCI WorldCom**. **Page 13.**
- **NetReality** to help bring SLAs to virtual nets. **Page 14.**
- **GTE Internetworking** to offer managed security services to the masses. **Page 34.**

**Online:**

- Log on for daily updates from the show.
- Coverage of **Network World's NOS Showdown**. **DocFinder: 6531**

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## Showtime for LAN switching

*Cisco and Cabletron to add new life to enterprise networks with switch and router offerings.*

BY JIM DUFFY

WASHINGTON, D.C. — Looking to help users get more bang out of their existing network gear, Cisco and Cabletron this week will offer a variety of LAN switching enhancements at ComNet 2000.

Cisco will roll out a new Catalyst 4000 switch and line card enhancements for the Catalyst 4000 and 5000 that will let users support new applications, such as converged voice/data programs. Rival Cabletron will enable

users of its SmartSwitch 6000 to transform the device into a Layer 3 switch via a new gigabit routing module.

In Cisco's case, the vendor is looking to add incremental core switch intelligence to wiring closet devices without requiring users to break the bank replacing older gear.

Cabletron too wants to help its installed base of SmartSwitch users upgrade those Layer 2 switches to Layer 3 devices without replacing entire boxes.

Cisco's offering will include See **ComNet**, page 108

## Blinded by the light

BY JIM DUFFY AND TIM GREENE

It's the Internet, stupid. The explosion in data traffic caused by the Internet is forcing service providers to seek new ways

to increase the capacity of their fiber-optic infrastructures and provision circuits within minutes instead of months. This data eruption is also prompting enterprise customers to seek out relationships with service providers that can guarantee continuous data network uptime and capacity, and that have the agility to turn up bandwidth on demand. And what technology is going to handle these radical changes? Optical switching.

Optical gear, which uses pulses of light to carry traffic, will be part of the buzz at this week's ComNet 2000 show, but it is also one of the hottest hardware and software development markets in the industry.

See **Optical**, page 16



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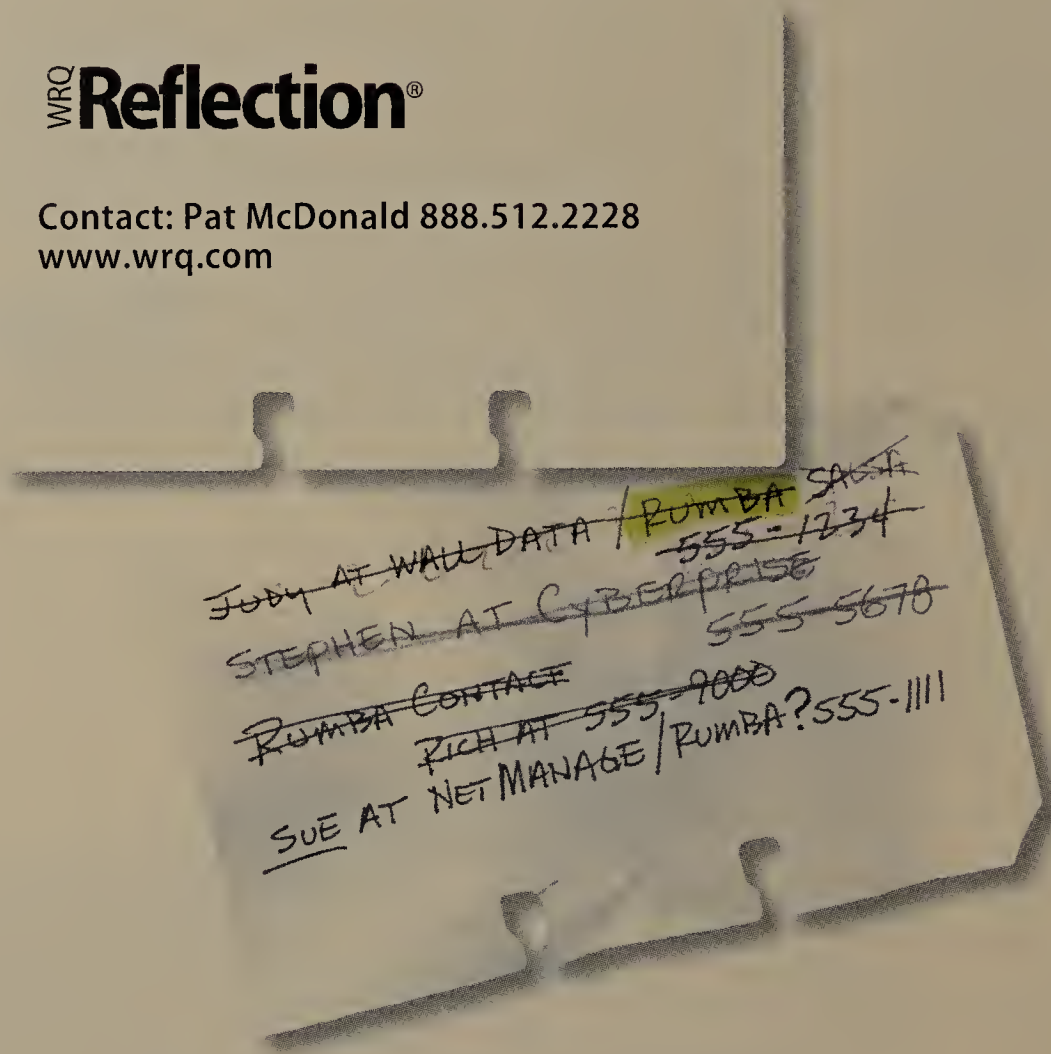
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THIS WEEK  
ONLINE



**Keeping Current.**

Would you buy Internet access from The Simpsons? Fred McClimans says if the price is right — say, free — you just might. Will corporate telecommuters begin dialing in to the sound of Bart Simpson in the near future? **DocFinder: 6534**

**NOS know-how.** If it's a network operating system (NOS) you want, then we've got the information to help you choose which is the best for you. From white papers to buyer's guides to a technology-specific search engine, you can find all the materials you need to make an informed decision. While you're online, take a look at our NOS review and find out how your favorite NOS fared. **DocFinder: 6529**

**ComNet 2000 coverage.** We're braving the Washington, D.C., snowstorms this week to bring you daily coverage from ComNet. Find out which network operating system (NOS) comes out on top with users in our NOS Showdown Lab. Also, read about which vendors passed muster with attendees of Network World's Network Operating System Showdown. **DocFinder: 6531**

**Water Cooler.** Did you know that Bruce Perens, primary author of the Open Source Definition, is a member of a mixed marriage? Yes, he's a Linux user and his wife is a Windows user. Find out more tidbits from News Editor Bob Brown as he immerses himself in the wacky world of Linux. **DocFinder: 6535**



**In the Works.** What would happen if the world started to turn away from U.S. characters in domains? We may be about to find out as China and Sweden stretch their international legs. The two countries want to use their own symbols in domains, but Internet Engineering Task Force Chair Fred Baker says that could cause technical and legal problems with our naming system. What's the solution? Hop online and give us your opinion. **DocFinder: 6536**

# NetworkWorld

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### HOW TO CONTACT US

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**STAFF:** See the masthead on page 14 for more contact information. **REPRINTS:** (717) 399-1900

## Special Focus

### HOSTED APPS SERVICES

The ASP effect on the software industry. Page 54.

## FEATURES

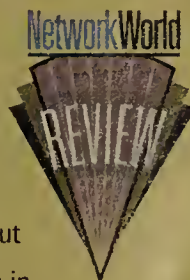
### SHOPPING SPREE

Network budgets were up 10% last year, according to the 1999 Network World Spending Survey. Turn to **page 65** for more results, including a look at which technologies are garnering big investments today.



### REVIEW:

In our hands-on review of four network operating systems, Microsoft's Windows 2000 is the overall winner, but Novell's NetWare 5.1 is tops in performance. **Page 71.**





## NEWS BRIEFS, JANUARY 24, 2000

### Kennard sees speedier reviews

The growth of wireless and digital subscriber line technologies and the potential for broadband cable is creating "a virtual Cuisinart of convergence" that is helping to make the Telecommunications Act of 1996 a success, Federal Communications Commission Chairman William Kennard said last week in his annual start-of-the-year press conference. The resulting "network of networks" is helping the country move through a period of mergers that might otherwise reduce competition, Kennard said. He declined to divulge his personal position on the America Online/Time Warner deal, saying only that the deal "will raise some interesting new issues because it's a different kind of merger." But he promised to speed up the FCC's merger review process, saying he expects the pure telecom megadeals — including that of MCI WorldCom/Sprint — to be decided in the first half of the year.

### Gerstner lays down the law

IBM has 180 days to do a 360-degree turn. The second half of 1999 was so dismal the company's steely CEO Lou Gerstner sent out an urgently worded memo to employees urging "a fast start" in 2000, says news agency Reuters. The firm posted gloomy fourth quarter results last week, with net profits dropping 10% on a 4% reduction of overall revenue. On Wednesday, Gerstner issued a call to arms:



Gerstner is urging IBMers to get off to "a fast start" in 2000.

"As I see it, we have two quarters — 180 days — to prove that the second half of 1999 was an aberration, not the beginning of a trend." The company's leaders will talk to IBM's personnel about "how we will roar through the first half of the year," Gerstner says.

### Chevron, Ariba share a ride

Last week, e-commerce software vendor Ariba joined with Chevron and venture capital firm CrossPoint Ventures in Woodside, Calif., to set up a new company called PetroCosm. The goal of the new company is to invite oil exploration, transportation and services companies to subscribe to PetroCosm to buy and sell products and services. Chevron is already a customer of the Ariba ORMS desktop procurement software, and the PetroCosm network will grow out of Chevron's Ariba installation. Chevron also plans to have the largest online catalog of gas-industry services and products for sale. PetroCosm

expects to earn revenue by completing online transactions between buyers and sellers. The PetroCosm founders have invited any oil or gas company to join as a founding member to obtain shares in the venture.

### Microsoft reiterates claims

Microsoft last week emphatically stated it did not break the law as alleged in the government's antitrust case against the software developer. In a 70-page legal filing submitted to Judge Thomas Penfield Jackson, Microsoft said it "respectfully disagrees" with Jackson's Nov. 5, 1999 findings that Microsoft is a monopoly. In the filing, known in legal terms as conclusions of law, Microsoft said it did not illegally tie the Windows operating system to Internet Explorer or unlawfully strike exclusive deals with its partners. The U.S. Department of Justice filed its conclusions of law last month and will file a reply to Microsoft's conclusions this week.

### Concord CEO wasn't kidding

Concord Communications CEO Jack Blaesus told *Network World* he was going to make acquisitions this year, although he didn't say when (see story, page 41). Just before our deadline, however, Blaesus put \$104 million where his mouth was, and Concord revealed it will buy FirstSense Software in a stock deal. Located in Marlborough, Mass., Concord plans to combine its network performance reporting tools with the Burlington, Mass., FirstSense's application and service-level management software. In exchange for 1.9 million shares of the firm's common stock, Concord will acquire all of FirstSense's outstanding stock. The transaction is expected to close next month.

## Take a spin at our booth

Those of you attending ComNet 2000 in Washington, D.C., this week are encouraged to drop by the *Network World* booth to see if you have the perfect combination to "crack our safe." Participants will be automatically entered in a contest to win a \$500 American Express gift check. *Network World* will be located at **Booth 1116**

# Mgmt. software takes to the Web

Web-based "newspapers" and "stock tickers" deliver news about your network.

BY JEFF CARUSO

Keeping tabs on network management and performance should get easier this week, as several vendors update their management tools with Web-based interfaces at ComNet 2000 in Washington, D.C.

Aprisma Management Technologies (formerly Cabletron's Spectrum business unit) will unveil software that lets helpdesk operators view and change the status of alarms generated through the Spectrum network management platform. NetScout Systems will update its WebCast reporting software, with a high-level report intended to provide an overview of network performance for executive managers.

The announcements follow FirstSense's shipment of Web-based reports for its FirstSense Enterprise software last week. FirstSense, which last week agreed to be acquired by Concord Communications (see news brief, this page), says its software measures how quickly end users are able to complete transactions, and now the results of the measurements can be accessed from a browser.

Making management information available through a Web browser means that people with less training can access the information, says Trent Waterhouse, director of product marketing at Aprisma. Most users can navigate Web pages more easily than a vendor's management client software, he says.

Web-based management is also good for sharing information in a standard way among different management tools, notes Elizabeth Rainge, research manager for network management at International Data Corp. in Framingham, Mass. If XML and the Common

Information Model (CIM) are used to represent management data to a Web interface, data from multiple sources can be combined. "XML is a major technology for the data management market," Rainge says.

Aprisma is using XML and CIM to pull data from Cisco's CiscoWorks management software along with data from its own Spectrum software. Because the details of how to represent data in CIM haven't all been ironed out, Aprisma had to work directly with Cisco for this integration, Waterhouse says.

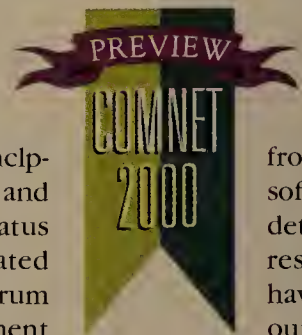
The company's new product, Web Operator, continuously shows network alarms in a "stock-ticker" format, he says. Users can click on a message and get details about the trouble. They can also acknowledge and clear a trouble ticket once the problem behind it has been solved.

Web Operator is shipping now, starting at \$5,000. It runs on Solaris and Windows NT.

Separately, NetScout's new edition of WebCast includes a "newspaper-style" report available through a browser, the company says. Version 3.1 can create a front page aimed at high-level executives, showing total traffic volume, and traffic trends broken down by protocol and application. The top under and overutilized network segments are also noted.

The report should make it easier for network managers to share information with less technical employees, NetScout says. More detailed information is still available for network managers. The new version is shipping now, for \$4,500.

FirstSense lets network managers set up reports, which its software can now publish as Web pages. This way, people See **Aprisma**, page 8







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Richard J. Heaps, COO, Clarent Corp.

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# Clock ticking on key encryption patent

Change could mean lower prices for security products using RSA public-key technology.

BY ELLEN MESSMER

SAN JOSE — RSA Security's patent for the most important encryption technology used in corporate networks is set to expire in September — an event that could lead to lower prices for software incorporating RSA public-key technology and new challenges to RSA Security's encryption industry leadership.

Funded by the U.S. government, RSA public-key technology debuted two decades ago as a dazzling concept in encryption. The technology has come to form the foundation for the Web's ubiquitous Secure Sockets Layer (SSL) security, as well as most e-mail encryption, digital certificates and virtual private network (VPN) software.

The technology, based on a complex math algorithm, is now used in popular products such as Microsoft and Netscape Web browsers and servers, Lotus Notes and Novell NetWare. The technology can be found in about 90% of all products sold with encryption.

## Mixed emotions

In the network industry, there is not only admiration for but also fear of cryptography kingpin RSA Security, which wields power through the licensing of its BSAFE tool kits for making products that

use the patented technology. Jim Bidzos, once the company president and now vice chairman of RSA Security's board of directors, built up the company's business through licensing deals.

But with its key patent expiring on Sept. 21, RSA Security for the first time is bound to find competitors. Chief among these firms will

be Certicom, which currently specializes in cryptography technology used in small, wireless devices such as 3Com's Palm Pilot.



**"We will compete against [RSA Security] with a product we will have out this year."**

Rick Dalmazzi, CEO, Certicom

Certicom CEO Rick Dalmazzi says, "We will compete against them with a product we will have out this year."

As a result of the new competition, it could become less expensive for software developers to incorporate RSA technology into products, though Certicom isn't promising that its tool kit will cost less than RSA Security's. However, some of RSA Security's 500 customers might take away business from the company by creating their own encryption code to avoid license fees.

According to several industry sources, RSA requires licensees to pay upfront costs that might add up to as much as 10% of the cost of their products, plus extra charges on each unit sold. Some licensees, speaking anonymously out of fear that RSA Security might yank their licenses, claim the company last year gave vendors a choice: Either sign up for new five-year licenses, or wait until the RSA patent runs out.

RSA Security, which last

week hosted about 8,000 people at its annual security conference in San Jose, wasn't willing to discuss its licensing policies in detail.

RSA Security does acknowledge its tool kits still account for about 30% of its revenue, but says it's not worried about the impending loss of its patent. The company has some large and apparently content

still go to RSA."

But there are a couple of other possible ramifications of the patent expiring.

There has been interest in making RSA — which has become an ISO and IETF standard — into open source software. Australian cryptographers have posted the RSA algorithm as SSL code on the Internet. (Because RSA Security holds only a U.S. patent, developers outside the U.S. can develop unlicensed copycat RSA implementations, but they can't sell products based on such implementations in the U.S. until the patent expires.)

And The Sun-Netscape Alliance has been trying to push RSA Security to make its code open source, says Claire Hough, vice president at the alliance. With the U.S. government now allowing strong encryption code to be posted on the 'Net, the alliance last week posted Netscape public-key infrastructure libraries to the mozilla.org Web site to let developers have free use of SSL and PKI. "But we had to strip out the RSA algorithm before posting it," Hough says.

## Interoperability issues?

And there is also the issue of whether the entry of new competitors in the encryption market will compromise interoperability, particularly among products supporting RSA-based SSL. Interoperability could erode when all users aren't using RSA Security's implementation of RSA, some observers say.

But John Ryan, CEO of security technology vendor Entrust, says any interoperability problems would be addressed immediately.

"If there were a problem with that, we'd wreck the golden goose of e-commerce," which relies on secure communications technology, Ryan says. The IETF and industry groups would quickly become a forum for SSL interoperability testing if problems cropped up, he adds. ■

Aprisma, continued from page 6

throughout an enterprise can access the reports and find out how well the company's applications are responding. These pages can be updated hourly, daily, weekly or monthly. The product is shipping now, starting at \$25,000.

## Network Mgmt.

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In related news, Micromuse this week will ship a slightly enhanced version of its Netcool/FireWall-1 software.

The application collects security information from Check Point Software firewalls and displays it in Micromuse's Netcool management tool. Version 1.1 of the application runs on Windows NT and adds customizable filters, letting network managers specify what traffic patterns might indicate a security breach.

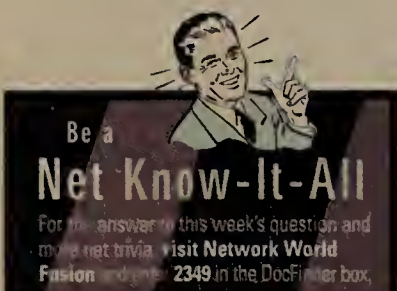
Micromuse will also announce the Netcool Developers Alliance. Vendors in the alliance use the company's software development kit to write programs to exchange management data between Netcool and their own management products.

Initial members include Aprisma, Architel Systems, Heroix, InfoVista, Integrated Research, Juniper Networks, Mediation Technologies, NDG Software, Packeteer, Pegasystems and Veritas.

Aprisma: [www.aprisma.com](http://www.aprisma.com); FirstSense: [www.firstsense.com](http://www.firstsense.com); Micromuse: [www.micromuse.com](http://www.micromuse.com); NetScout: [www.netscout.com](http://www.netscout.com)

## Correction

A recent brief (NW, Jan. 10, page 17) incorrectly stated that Alteon Web-Systems shipped the first copper-based Gigabit Ethernet adapters. Sys-Konnect started shipping the first such adapters a month earlier.



## This week's question:

Which service provider used to be known as Associated Communications?

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	56K, T1	✓	✓
ROUTING	OSPF	✓	✓
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	Legacy Protocols	✓	✓
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# Chip start-up targets growing 'Net appliance market

BY MARC SONGINI

**SANTA CLARA** — Transmeta, a 5-year-old "start-up," has come out of hiding and is boldly claiming its new power-efficient processors could help create a new generation of high-performance, low-cost Internet

appliances and thin clients.

Until now, the secretive Transmeta's major claim to fame was its high-profile list of employees and investors — among its engineers is Linus Torvalds, father of the Linux operating system. Last week, during a much-hyped nationally televised press con-

ference, Transmeta pulled off the veil from its family of microprocessors, dubbed Crusoe.

The first iteration includes two processors: the TM5400 for Windows-based notebooks; and the TM3120, which could be embedded in Internet appliances or thin clients running a version of the Linux operating system. The cost of the chips will range from \$65 to \$329, and their speeds will run from 333 to 700 MHz, the firm says.

Transmeta says its chips can translate and execute code written for Intel x86 Pentium processors. They do this by converting the x86 instructions into very long instruction word commands, which can be read in the chips' specially designed software, not in silicon, as is done in most other microprocessors, Transmeta says.

Because of its simple design, the Crusoe family will use only about one watt of electricity, guaranteeing longer battery life than most other chips, which

## PROFILE: TRANSMETA

**Headquarters:** Santa Clara

**Founded:** 1995

**Product:** Microprocessors that run Linux and Windows operating systems on notebooks and Internet appliances.

**Funding:** Privately held; Paul Allen, co-founder of Microsoft, is a key investor.

**Key employees:** David Ditzel, CEO; engineering team includes Linus Torvalds, creator of Linux.

**Employees:** 200

**Fun Fact:** The chip name Crusoe derives from the 18th century novel, "Robinson Crusoe," whose hero was shipwrecked on a deserted island.

## Novell unveils IP-based version of ManageWise

BY DENI CONNOR

Users with NetWare 5 or mixed NetWare/Windows NT networks will soon be able to more efficiently manage IP segments and devices using Novell's ManageWise.

This week's release of ManageWise 2.7 includes support for "pure IP," as well as Novell's proprietary Inter-network Packet Exchange (IPX) protocol. While Net-

mode, which can cause significant bandwidth consumption and line congestion.

"An IP-based ManageWise is important to us in our migration to IP," says Boyd Wilson, manager of computing resources at Miami University in Oxford, Ohio. "We are using ManageWise to monitor our servers and for gathering SNMP statistics."

The university is migrating from NetWare 5 and IPX-based NetWare 4.11 to NetWare 5.1, Novell's most recent release.

"The rest of Novell is going to all-IP, so why shouldn't ManageWise? Most NetWare 5 and many NetWare 4 users are running IP as well," says Ray Paquet, an analyst with Gartner Group in Stamford, Conn. ManageWise provides better management of NetWare servers than other products such as Intel's LANdesk or HP OpenView, Paquet says.

ManageWise accounts for about half of the NetWare management market, according to Novell.

The firm also announced it will bundle the ManageWise Agent for Windows NT Server with ManageWise 2.7. This agent will also work with Windows 2000 networks. Previously it sold separately for \$700 per Windows NT server.

ManageWise 2.7 starts at \$75 per user. Novell will offer competitive upgrades to users of Intel's LANdesk, HP OpenView or Microsoft's Systems Management Server for \$40 per user. Current ManageWise users can also upgrade for the same price. ■

### New features in ManageWise:

- IP support.
- Windows NT agent.
- McAfee VirusScan and NetShield.



Ware 5, which has been shipping for more than a year, uses IP as its native transport protocol, users were only able to map and discover IP networks and segments in compatibility mode.

Compatibility mode provided a way for IPX-based applications such as ManageWise to continue to work in an IP network. IP-based NetWare 4.11 networks use compatibility

## IBM to tout copper-chip-powered Web servers

*New chips to enable RS/6000s to run faster, more efficiently.*

BY MARC SONGINI

**SAN DIEGO** — IBM this week is expected to roll out two RS/6000 Unix servers powered by the company's newfangled copper chips and optimized to handle Web applications.

IBM says the entry-level RS/6000s are well-suited for handling Web traffic because of the high number of simultaneous Web connections they can support. The company will target the machines at small and midsize companies looking to set up Web servers and run general-purpose applications, as well as at large companies looking to bolster their Web sites.

One of the major draws of these servers is that they will sport IBM's new copper-based Power3-II processors, which burn cooler and consume less power than most other chips, which use aluminum. The chips consume about one-third less power and run up to six times

generally consume about 100 watts. But the company says Crusoe will still be able to power a PC or run streaming video applications off the 'Net. The chips should start appearing in products by midyear.

Transmeta's processors will probably not revolutionize the network device industry, nor is the idea behind the processors entirely new, says Martin Rey-

nolds, an analyst with Dataquest, a San Jose consultancy. But in the long run, the chips could enable the creation of more powerful handheld Web devices and thin clients for the anticipated millions of mobile Internet workers that will eventually come online, he says.

Network appliance maker S3 plans to build 'Net appliances based on Crusoe chips. ■

faster than the processors in the RS/6000s that the new servers will be replacing, says Tim Dougherty, an IBM business director.

This means the 44P 170 and 270 can run more applications and handle more users simulta-

450, which is priced at about \$20,000.

The new servers should appeal to existing IBM users and first-time Web server buyers, but they are probably not different enough to win over existing Sun customers or users of Compaq Windows NT servers, says Andrew Allison, a consultant and industry newsletter publisher in Carmel, Calif.

The 270 can be configured with up to four 333-MHz Power3-II chips and has up to 8G bytes of error correcting code (ECC) memory and 54.6G bytes of storage. The 170 can handle one 333- or 400-MHz chip and has 2G bytes of ECC memory and 72.8G bytes of storage. The 270 costs from \$17,000 to \$36,000; the 170 starts at \$10,500. The servers are being introduced at IBM's Partnerworld trade show in San Diego this week and will become generally available on Feb. 25.

IBM: [www.ibm.com](http://www.ibm.com)



**IBM's RS/6000 servers are getting new copper chips that are optimized for Web apps.**

neously. According to independent tests, the 270 can handle more than 1,300 simultaneous Web connections, which Dougherty says represents 40% more capacity than the server's direct competitor, the Sun Enterprise 450. He says a 270 costs about \$3,000 less than a similarly configured Enterprise



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# Lotus finally opens Notes client to the world

BY JOHN FONTANA

ORLANDO — Lotus is finally ready to share its cherished replication engine and give end users options for client access.

At last week's Lotusphere 2000 conference, the company detailed its forthcoming Domino Offline Services (DOLS), which will open Lotus' replication technology to Microsoft Outlook and Web browser clients.

The move means users will be able to connect non-Notes clients to Domino with the option of running applications offline before connecting to the server and replicating changes. But while DOLS opens up client-side options, it will require applications to be DOLS-enabled.

"The question is,

will companies be willing to retrofit their applications?" says Matt Cain, an analyst with Meta Group in Stamford,



Conn. "It won't be easy to do. You'll have to examine how application logic is exposed."

Lotus has already DOLS-enabled one of its applications, QuickPlace 2.0, which will ship later this year.

DOLS is actually a tool kit for assembling chunks of code to run on non-Notes clients. Lotus has prebuilt code, which it is calling iNotes, for Outlook and Web browsers. The iNotes code will allow

Domino mail, calendar and task services to be used offline through Outlook. With a Web browser, users can get those services plus offline access to Domino DOLS-enabled applications.

"With DOLS, we can get away from the Notes client and avoid its overhead on the desktop," says Gregg Smith, senior software specialist for American Express Technologies in Phoenix. "The key is to get an interface that looks like the Web but is really Notes underneath."

Lotus went down this path with little success a few years ago with a client called Weblicator, which was designed to provide replication to Web browsers.

The DOLS tool kit allows subsets of Notes client code, such as Java, MAPI, security,

database and replication services, to be packaged and installed on client software. The code, which can be upwards of 18M bytes, can be automatically downloaded from the Domino server or distributed on CD.

"Lotus is finally allowing users their client of choice," says Jonathan Spira, an analyst with the Basex Group, a consulting firm in New York. "The most important aspect is the ability for non-Notes clients to work offline."

Even before DOLS ships later this quarter, Lotus is already planning improvements.

"We are working with partners to develop mechanisms such as the ability to initiate a database discussion from Outlook," says Jeanette Medlin, director of collaboration product marketing. "And

we are exploring the option of starting a QuickPlace from Outlook." QuickPlace is a tool for creating "team" workspaces.

Medlin did say, however, that Lotus will not turn Outlook into a Notes client.

## Outlook needed

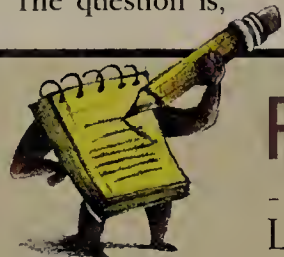
Lotus officials say Outlook support is necessary because a large number of their customers have access to Outlook through Microsoft Office.

Ironically, Outlook also is the client Microsoft is using for the Digital Dashboard interface on its knowledge management infrastructure, which the company will position against Lotus' similar offering, code-named Raven.

The first version of DOLS, which is supported in Domino 5.03, will run on Windows 95 and 98 clients and NT servers. An OS/2 version will follow.

Lotus also will increase its base Domino client access license from \$40 to \$50 per seat to include DOLS-enhanced clients. A server licensing version will let users run DOLS-enabled applications to anonymous users located outside a company's firewall.

Also on the client front, Lotus introduced Mobile Notes, which lets handheld devices access e-mail, calendar and directory services in Domino. Lotus plans to add support in the future for the Wireless Access Protocol, XML and offline use. ■



## Reporter's Notebook

LOTUSPHERE 2000

### Not ravin' about Raven

The featured Lotusphere topic, the Raven knowledge management suite, packed conference sessions, tutorials and how-to talks, but many left with more questions than answers.

"They're creating expectations they won't deliver on for a while," says Bruce Alper, chief information officer of the American Management Association in New York. "I would not go to Vegas and bet on Raven's delivery."

Lotus says Raven will ship midyear and has been in private beta testing with 20 customers for the past month. Lotus didn't demo anything markedly different from when the company first showed Raven in October. Perhaps a packed conference session showed where interest really lies.

Questions after the session focused solely on operational processes and not technology.

"The tools don't matter," said Adrian Poplawski, a network analyst for the Canadian International Development Agency. "Knowledge management is 90% a process problem and 10% a technology issue."

### Papows' farewell

Outgoing CEO Jeff Papows circulated among the Lotus faithful last week extending his thanks and saying goodbye. But he could not escape questions as to why he is leaving.

Papows again denied that newspaper accounts of him exaggerating his military and educational exploits and allegations brought in a sexual harassment suit were connected to his departure.



"The company is at its peak of product and business strength," Papows said, noting he is leaving at a time when his departure will cause the least disruption. Papows' successor, Al Zollar, stayed in the background for most of the show, though he did give closing remarks. Zollar takes over next week.

### Putting fannies in the seats

Continuing its string of strong fourth quarters, Lotus officials said they added 8.5 million seats of Notes/Domino in the last three months of 1999. The total of 22 million seats for the year beat projections by three million. Lotus now has 56 million seats.



### Trick or treat

Although Lotus sold some 160,000 seats of cc:Mail last year, sales will end for good on Halloween. Support and maintenance will cease at year-end, and code fixes will halt on Jan. 31, 2001.

### Trial balloon?

After announcing new pricing models for Notes/Domino, Lotus failed to talk dollar amounts. Rest assured, Lotus officials said, the numbers will come at the end of this quarter on six new options all built on top of the existing Corporate Enterprise Option, which includes basic messaging, calendars and other features.

One new pricing tier will add Sametime and QuickPlace. Other tiers tack on pervasive messaging (mobile services), e-Apps (workflow, WebSphere), document management and search, and distributed learning.

— John Fontana

www.nwfusion.com

## LOOKING BACK AT LOTUSPHERE

### Here's what you may have missed:

Notes client creates training hurdle for customers.

Lotus, IBM integration plan emerges.

Check online for more reports from last week's show.





# MCI WorldCom plunges into voice/data integration

*Converged-services offering likely to include ATM combined with latest integrated-access devices.*

BY DAVID ROHDE

WASHINGTON, D.C. — MCI WorldCom, which has lacked a converged-services offering similar to those from AT&T and Sprint, this week is expected to announce an ATM-based integrated-access service of its own.

The MCI WorldCom offering, which will probably be disclosed at ComNet 2000, will be based on a choice of integrated-access devices (IAD) placed by the carrier on the customer premise. The devices will come from West Coast firms Accelerated Networks and Mariposa Technology.

According to well-placed sources, the service will likely employ ATM switched virtual circuits that don't have to be preprovisioned by the carrier. As a result, users not only will be able to combine voice and data traffic

over the same access facility, but will also have greater circuit-reconfiguration flexibility than they do with many other convergence offerings.

And depending on which access box they choose, users may also be able to take advantage of potentially money-saving access options such as digital subscriber line and inverse multiplexing over ATM, in addition to the T-1 lines that carriers typically offer in their integrated-access packages.

It is unclear whether MCI WorldCom's service announcement will involve a firm availability date with pricing, or will be more of an initial unveiling before releasing full details later in the year.

Analysts say that even though MCI WorldCom is attempting to buy Sprint

— whose ATM-based Integrated On-Demand Network (ION) has been marketed heavily over the past 18 months — MCI needs a convergence story of its own. The merger with Sprint is receiving tough scrutiny from U.S. and European regulators, and even if the deal is approved, integration of the two companies is likely to be a laborious process. Meanwhile, customers with requests for proposal coming out this year are looking for a statement of direction about how MCI WorldCom intends to pull voice and data together on its own network.

For the past two years, MCI WorldCom, which owns more extensive local fiber than its long-distance rivals, has emphasized its end-to-end transport capability via its On-Net service. At times, On-Net's broadband capabilities have been compared to ION and AT&T's ATM-based Integrated

Network Connection Service (INCS), which employ Cisco and Nortel Networks customer-premise equipment to concentrate voice and data traffic onto an ATM backbone.

But On-Net is unlike ION and INCS in that it doesn't include a well-defined, standard option to have the carrier own and manage integrated-access equipment on the customer premise, says Lisa Pierce, a telecom analyst at Giga Information Group. "They are feeling pressured because of certain key accounts to [offer] an alternative to INCS and ION," she says.

Officials at Accelerated Networks confirmed that MCI WorldCom has been testing Accelerated's equipment and will demonstrate an SVC-based convergence service using Accelerated's devices at ComNet. MCI WorldCom and Mariposa officials declined comment. ■



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### WIPO tells cybersquatter to return domain name

Michael Bosman learned the hard way not to mess with the World Wrestling Federation. No, Stone Cold Steve Austin did not deliver a stunner, nor did Grand Master Sexay nail him with a side Russian leg sweep. There was no violence at all. Instead the World Intellectual Property Organization (WIPO) told Bosman that he was a cybersquatter and had no right to the domain name worldwrestlingfederation.com. **DocFinder: 6540**

### Intel adapters handle IPsec encryption processing

IP Security (IPsec) sounds great — until you try to use it. Did you know that handling IPsec encryption takes just about every clock cycle a typical processor has? And a server or client system processing IPsec has its network throughput cut by nearly 80%. Intel, which makes the easily waylaid processors, has an answer — another processor. That's right — Intel suggests buying its dedicated IPsec adapters, which will off-load the encryption processing from overburdened Intel CPUs. **DocFinder: 6539**

### FCC merger decisions to speed up

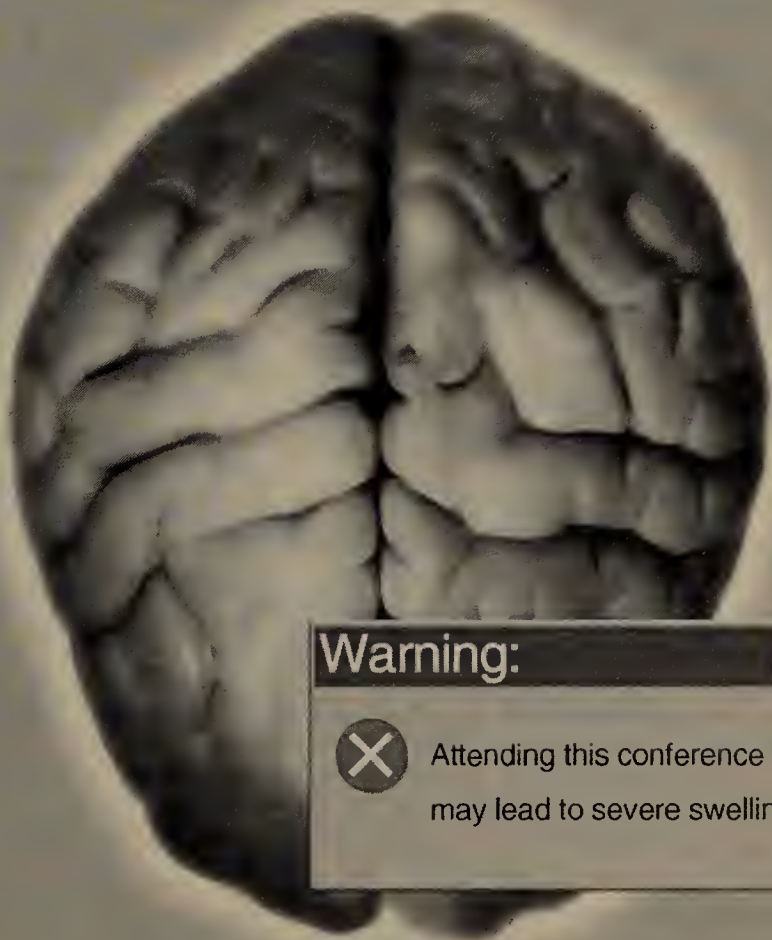
Say what you want about Federal Communications Commission Chairman William Kennard, this guy is no slouch. The fast-moving Kennard last week said his agency would not drag its feet deciding whether to bless telecom mergers such as the union of MCI WorldCom and Sprint or the recently announced uniting of America Online and Time Warner. Kennard also promised to tackle the area code problem and to help promote fixed wireless, a mighty promising broadband alternative. **DocFinder: 6538**

### Motorola develops long-lasting fuel cell for electronic devices

Chip giant Motorola is developing a fuel cell for electronic devices such as laptops and handheld computers. If the project succeeds, we may have cell phones that run for a month. And instead of trucking around a bulky recharger, you would simply slide in a new fuel unit. Unfortunately, Motorola doesn't expect the cell to be completed for five years. **DocFinder: 6537**



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# VPN and bandwidth mgmt. come together

BY DENISE  
PAPPALARDO

WASHINGTON, D.C. — Predicting the reliability of an IP virtual private network (VPN) has been difficult for network managers and service providers, but NetReality is hoping to change that with its latest management system.

This week at ComNet 2000, NetReality is introducing Wise/IP Accelerator, a hardware and software system that will let ISPs offer VPN services with more stringent service-level agreements (SLA).

Wise/IP Accelerator includes NetReality's WiseWan bandwidth management devices and new IP Accelerator management software, which monitors packet loss and network jitter while guaranteeing network throughput and bandwidth management across a VPN.

"Wise/IP Accelerator enables not only service-monitoring capabilities, but the ability to shape traffic flow across a VPN," says Dennis Drogseth, a director at Enterprise Management Associates (EMA), a consulting firm in Boulder, Colo. "It allows users to take action and prioritize traffic on their VPN."

NetReality has sold WiseWan devices primarily to business users who wanted more control over their dedicated Internet access connections. Wise/IP Accelerator is for service providers that want to offer fully managed VPN services with SLAs that reach beyond standard network availability and round-trip latency guarantees, says Bob VanSickle, NetReality's director of carrier sales.

An ISP that offers a VPN service based on NetReality's products would need to install a WiseWan device at each site that's connecting to a customer's VPN. The WiseWan device sits behind an access router at each site. Software on the device lets an ISP monitor and maintain it from a centralized location using the IP Accelerator management system. Customers would tell their ISP how much bandwidth they wanted dedicated across their VPN for specific types of traffic based on application, IP

address or URL.

IP Accelerator also monitors packet loss and latency over a VPN by sending datagrams from site to site. This feature will let an ISP offer customers SLAs that cover an entire VPN instead of only the portion that runs over an ISP's net.

NetReality isn't the only vendor offering end-to-end VPN systems. Lucent last week announced its Secure VPN product line, which integrates its Ascend Communications and Xedia VPN products with Lucent's original VPN devices. Lucent last year acquired Xedia and Ascend. The bandwidth management features in Xedia's product line will not be ported over to Lucent's other VPN Routers and VPN Gateways until later this year. Lucent is rolling out a unified management system that can be used to maintain its VPN products.

Also in VPN news, Radguard and Allot Commu-nica-

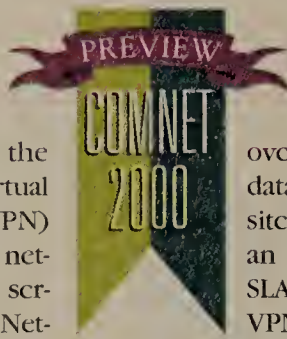
tions announced last week they are bundling Radguard's cIPro VPN devices and Allot's NetEnforcer bandwidth management devices so users can set up a secure VPN that includes bandwidth management features. But the two products aren't integrated yet and don't include one centralized management system.

EMA's Drogseth says a handful of vendors will roll out VPN

systems like NetReality's in the next few months. ISPs are looking to offer differentiated VPN offerings with more detailed guarantees, which is expected to fuel further product developments in this arena, he says.

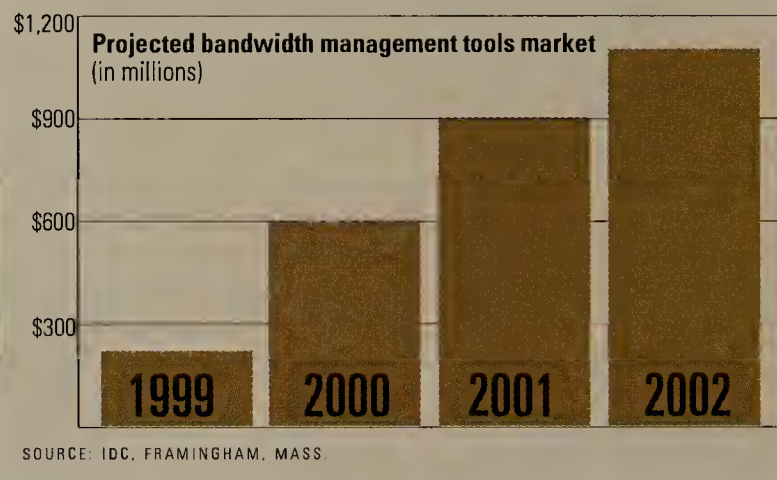
Wise/IP Accelerator is slated for availability next month, when several ISPs are expected to start testing the products.

NetReality: [www.netreality.com](http://www.netreality.com)



## Bandwidth management boom

Analysts say that the market for bandwidth management software will grow to nearly five times its current size by 2002.



## Net security firms Baltimore, CyberTrust unite

*Irish technology firm plans to phase out CyberTrust software.*

BY ELLEN MESSMER

DUBLIN, IRELAND — Baltimore Technologies last week announced it will purchase competing digital certificate software vendor CyberTrust in a \$150 million stock transaction and indicated that CyberTrust's software will eventually be phased out in favor of Baltimore's.

While the CyberTrust software label won't endure, Baltimore executives emphasize the combined company will continue to support CyberTrust customers, such as American Express, Visa and the U.S. Department of Defense.

The companies sell public-key infrastructure (PKI) packages, which contain server software as well as tools for creating, distributing and validating digital certificates used to digitally sign electronic documents and ensure they aren't tam-

pered with as they traverse networks.

Baltimore, a Dublin, Ireland, company with growing success in Europe and Asia, views its planned acquisition of CyberTrust as a way to gain a firmer foothold in the U.S. and enter the certificate-hosting business, in which CyberTrust is an established player. According to research firm International Data Corp., the worldwide market for PKI software and services will grow from almost \$200 million last year to an estimated \$350 million this year. Baltimore recorded \$30 million in revenue last year, while CyberTrust posted roughly half that.

CyberTrust operates secure data facilities in Needham Heights, Mass., and Sapporo, Japan, where corporations can outsource the job of digital certificate issuance, validation and management to CyberTrust, a

unit of GTE.

The fact that Baltimore is based overseas is raising questions in the U.S. military about whether it's appropriate for a foreign company to provide digital-certificate security services to the Defense Department.

"It would certainly be an issue for Baltimore to buy CyberTrust," says Petrine Gillman, director of security management infrastructure at the National Security Agency (NSA) at Fort Meade, Md. The NSA manages the Defense Department's PKI deployment, now counted at about 300,000 users of X.509 certificates.

She says the Defense Department, which began using certificates five years ago, makes use of home-grown PKI software, but also has used CyberTrust support services. Baltimore is currently in discussions with the NSA. ▀

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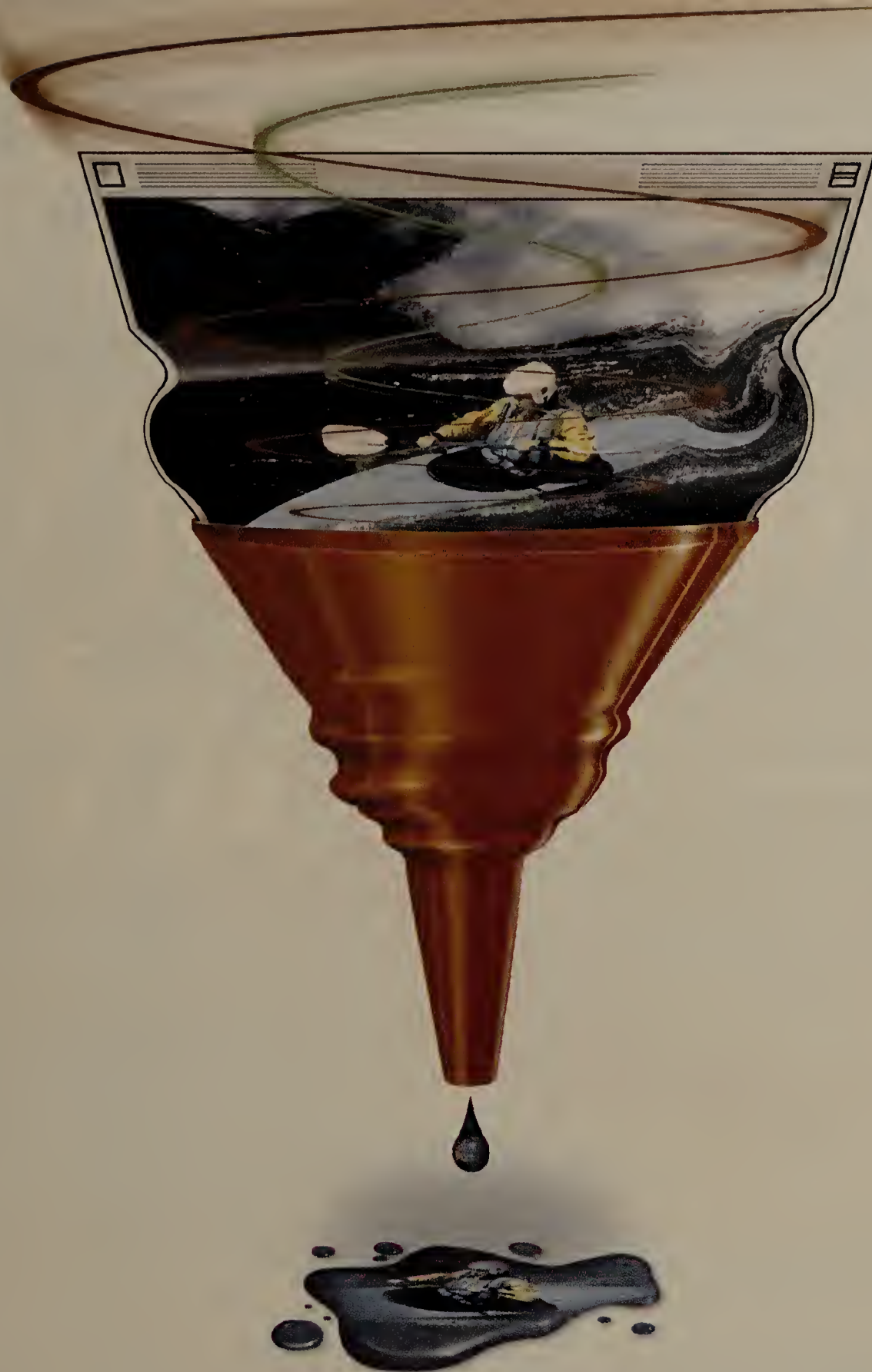
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## Optical continued from page 1

For example:

- Start-up Optical Networks this week at ComNet will announce \$50 million in new customer wins, \$75 million in new funding and 58,000 square feet of new manufacturing space.

- Cisco has spent close to \$10 billion to acquire three optical networking companies in the past six months.

- Venture capital firms have put billions of dollars into optical network firms in the past year (see graphic).

In optical networks, wavelengths of light become discrete channels that can be transmitted over long-haul, metropolitan-area networks (MAN) or "last mile" access networks at terabit speeds.

Transmitting data as light instead of electrical impulses makes for greater bandwidth capacity and more efficient use of bandwidth, says Chris Nicoll, an analyst at Current Analysis in Sterling, Va.

"With Internet access speeds going up because of DSL and cable modem deployment, we're seeing the old bottleneck — the 'last mile' — starting to expand slowly," Nicoll says. "If digital subscriber line deployment rates can match expectations, then the metropolitan- and wide-area networks are going to have to scale up as well."

"The thing about a fiber is that you've almost got infinitely scalable bandwidth on that one connection," he says. "You don't get that with copper."

Lucent, for example, says it has loaded up a single fiber with 1,022 wavelengths in its labs, meaning bandwidth so plentiful that enterprise users could indulge in just about any high-speed WAN applications they choose.

But fiber technologies up to now — the most predominant being SONET — did not take full advantage of fiber's scale or flexibility. With today's SONET switches, which are optimized for voice transmission, bandwidth was still provisioned manually and statically.

"Most optical networks at best have SONET [Add/Drop Multiplexing] switches and possibly some broadband digital cross-connects that operate at a DS-3 level. These switches just don't give you the full flexibility to reconfigure your network

any way you want to," says Andy Wright, chief technologist at Williams Telecommunications in Tulsa, Okla.

Newer, more intelligent optical switching and transport technologies are being developed to supplant SONET. Rather than the set bandwidth SONET provides, intelligent optical networking will provide more flexible bandwidth to carry bursty data traffic more efficiently.

Dense wave division multiplexing (DWDM) technology is expanding the capacity of existing fiber by adding wavelength after wavelength of light to a single strand. To feed these DWDM backbones, vendors are

Marietta, Ga., and one of Optical Networks' new customers. "The speed that we can turn up new services improves dramatically because we don't need to send crews out to reinforce existing fiber or run new splices — the capacity is already there. You just turn it on, and typically speed wins out over price in deploying telecom services in a competitive environment."

Optical switching has dramatic cost benefits for enterprise customers. For example, Quantum Bridge makes passive optical network equipment designed to bring fiber directly to customer sites. The company claims carriers using its gear can charge \$500 to \$1,000 per

Investors are pouring money into start-ups such as Quantum Bridge that are building the equipment needed to create these optical networks. Appian Way has \$22 million in venture funding to build customer-site access gear it claims will cut the hardware cost of accessing a megabit of bandwidth from \$700, the price of DSL line, to \$30 per megabit.

Tenor Networks has raised \$22.5 million to develop an optical service switch that can convert the light signal to electric, read the packets, then forward them to the right light-stream in the optical core. Tenor says the switch will read and enforce different qualities

voice, and are designed to let service providers accommodate rapid changes in network traffic in a matter of minutes instead of days.

Cisco also acquired Monterey Networks last summer. Monterey builds optical cross-connect technology that is used to quickly provision capacity at the core of an optical network.

In December, Cisco acquired another optical networking company, this one a maker of DWDM gear: Pirelli Optical Systems, which produces 128 channel OC-192 — or 10G bit/sec — long-haul DWDM transport systems. And in December of 1998, Cisco acquired PipeLinks, a developer of SONET routers that enable service providers to simultaneously transport circuit-based traffic while routing IP packets.

Combined, the acquisitions of PipeLinks, Cerent, Monterey and Pirelli — along with Cisco's own optical switch, the Gigabit Switch Router 12000 — enable Cisco to address a market which will reach an estimated \$40 billion by 2005.

Is Cisco done? Not by a long shot, Russo says.

"Optical networking is evolving so rapidly that we're going to continue to build out the product portfolio that our customers need to build these next-generation Internet transport networks," he says.

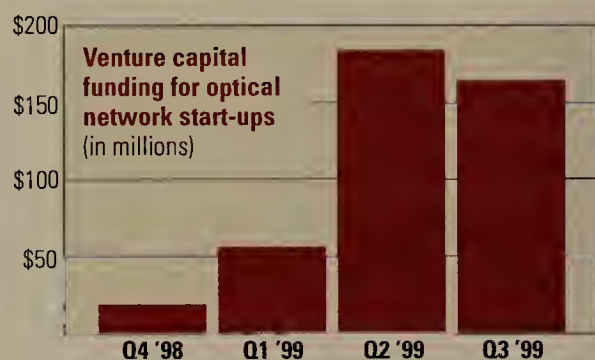
Similarly, Nortel Networks leaves the door open to more acquisitions following its purchase of Qtera, whose technology extends the reach of wavelengths over fiber. "We're going to do whatever it takes to get new technology — internal development and acquisition," says Ashoka Valia, vice president of strategic marketing for Nortel's optical networking group.

Lucent so far has been more home-grown in its approach, but it has made investments in optical start-ups, giving them access to new technologies beyond their own R&D group, says Kathy Szlag, vice president of marketing for Lucent's optical networking group.

With all the investments so far, expect carriers to start offering services supported by these new networks early next year, says Andrew McCormick, a senior analyst with Aberdeen Group in Boston. Trials of all-optical network services are already underway. ■

## Industry shining light on optical switching

As venture capitalists continue to pour money into optical network start-ups . . .



. . . major network companies are snapping up vendors of optical gear.

Company	Company bought	Technology	Price
Cisco	Cerent	SONET gear	\$6.9 billion
	Monterey	Optical cross connects	\$500 million
	Pirelli Optical Systems	DWDM gear	\$2.15 billion
	PipeLinks	SONET routers	\$126 million
Lucent	Chromatis	Metro-optical access gear	undisclosed
Nortel	Qtera	Long-haul optical gear	\$2.5 billion

SOURCE: PRICEWATERHOUSECOOPERS/NETWORK WORLD VENTURE CAPITAL SURVEY

building peripheral hardware with the smarts and flexibility to provision bandwidth dynamically and instantly to handle the peak-and-valley nature of data transmission.

The vast capacity and provisioning flexibility of optical networking is spawning a new class of services from service providers as well. For example, instead of T-1 or T-3 circuits, service providers can offer 100M bit/sec, or 1G or 10G bit/sec Ethernet services. Enterprises considering outsourcing their WANs today may be outsourcing their LANs tomorrow.

"With optical networking, we can easily deploy Gigabit Ethernet in the right places," says Peter LaHatte, director of marketing at Marietta FiberNet, a MAN service provider in

month for a 10M bit/sec service and still make a profit. That is more than six times the bandwidth for about the price of a T-1.

"Our objective is to figure out ways to offer [multigigabit] services to ISPs cost effectively so they can keep their cost down to the customer," Wright says.

Service variety also means less capital equipment investment for enterprise customers. Customers will be able to plug their existing equipment into optical access boxes supplied by service providers. "It might not seem optical to them. They'd just connect their PBX or router to it," says Rosemary Cochran, an analyst with Vertical Systems Group in Dedham, Mass.

of service and also track how much traffic each customer is sending, giving carriers the ability to charge for services based on use rather than bandwidth.

While upstarts are providing pieces to the puzzle, the big network vendors are spending big money to buy up the technology and know-how they need to make all the necessary gear to build new optical networks.

Carl Russo, group vice president of Cisco's optical products group, joined Cisco following Cisco's acquisition last summer of Cerent, a maker of SONET transport products that combine add/drop multiplexing, digital cross-connect, time division multiplexing as well as packet and cell switching. Cerent's SONET products are optimized for data rather than



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Keystone24g features 24 10/100 and two optional Gigabit uplink ports

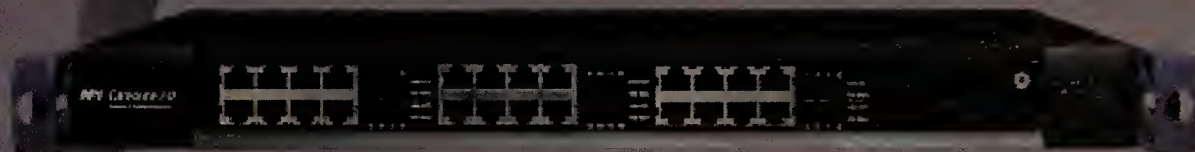


The Cornerstone6g offers six Gigabit Ethernet ports, and supports an optional 6-port Gigabit module. All Gigabit ports are available in copper SX or LX. Also features 16 port 10/100 module.

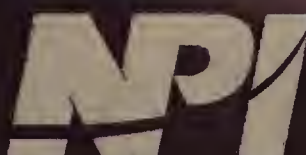
Capstone8f fiber slave unit



Capstone24t twisted pair slave unit



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IBM: [www.ibm.com](http://www.ibm.com)

Sun has announced storage management software for the enterprise Sun StorEdge A5x00 array family. The StorEdge Management Console and Component Manager, the software lets users manage multiple storage devices from a single management console. The software is Java-based and will conform to Sun's Jiro storage management specification, allowing monitoring and control of storage platforms from other vendors. The StorEdge Management Console lets net professionals monitor entire storage configurations and do performance tuning. Customers can use the application to graphically display a map of the storage network showing the status of hard drives and tape libraries. Sun StorEdge Management Console is available now starting at \$21,000.

Sun: [www.sun.com](http://www.sun.com)

IBM has added improved security and performance features to its 4758 models 2 and 23 Cryptographic Coprocessor PCI cards for Windows NT servers. The improvements include the ability for users to off-load encryption functions from one Web server to other servers in the network. The cards will be available in the second quarter of 2000. Model 2 starts at \$3,165; Model 23 starts at \$2,690.

IBM: [www.ibm.com](http://www.ibm.com)

## Dell servers target Unix Web hosts

BY DENI CONNOR

**N**etwork professionals wanting Intel-based Web or application servers that are as fast as Unix boxes might want to take a look at the servers Dell is introducing this week.

Dell will roll out two 800-MHz processors that the company claims are ideal for Web hosting, e-commerce authentication or application servers. The single- and dual-processor PowerEdge servers are Pentium III Xeon systems with 133-MHz front-side buses that feature an advanced caching system. The frontside bus is the data path between the processor and memory. By moving Level 2 cache from the backside bus to the frontside, performance is increased.



**Dell has pumped up the power of its PowerEdge server to handle Web-hosting duties.**

That system increases processing and performance speeds by placing the 256K-byte Level 2 cache directly on the processor chipset.

"For a very heavy Web site with a lot of application and transaction traffic, the more horsepower the better," says Mike Zeiman, IT analyst for Dow Chemical Employees Credit Union in Midland, Mich. "Traditionally, the Intel platform has fallen behind in performance to some Unix boxes. This is a place where someone may look at the Intel platform in place of a Unix box."

Dell will announce the PowerEdge 2450, a rack-mounted machine that accommodates up to 21 servers in a standard rack. The 2450 supports hot-pluggable redundant drives,

optional hot-pluggable power supplies, 2G bytes of memory and up to 89G bytes of internal memory.

The server contains an on-board 10/100M bit/sec Ethernet network adapter and a single-channel Ultra3 SCSI RAID controller on the motherboard for easy connectivity to internal storage. The 2450, which can be clustered, can run Windows NT and 2000, NetWare and Linux operating systems. Prices begin at \$4,000. The box is available now.

The PowerEdge 4400, in addition, offers a floor- as well as rack-mounted configuration with up to 4G bytes of RAM, 288G bytes of internal storage, dual-channel Ultra3 SCSI RAID controller on the motherboard and 64-bit quad independent PCI bus support. Both servers also support Fibre Channel. The 4400's pricing begins at \$4,700. The server is available immediately.

Dell: [www.dell.com](http://www.dell.com)

## IBM and Cisco collaborate to prioritize network traffic

*IP traffic prioritization and load-balancing features added to mixed IBM-Cisco environments.*

BY MARC SONGINI

**RESEARCH TRIANGLE PARK, N.C.** — The alliance between one-time network rivals IBM and Cisco is beginning to bear fruit.

Last week in a joint announcement, the companies said they had been working to make IBM S/390 mainframes and Cisco routers work together for improved load balancing and quality-of-service (QoS) features. The goal: to let users of Cisco-IBM gear gain greater reliability and availability for their IP networks, the companies say.

This is the first joint announcement since the companies inked a deal last summer in which IBM sold Cisco its IP and Ethernet routing and switching lines. The deal is allowing greater cooperation between Cisco and the IBM server group — especially the S/390 mainframe division, the companies say.

For starters, Cisco now claims that modifications to its router software can boost IP traffic performance by up to 700% between its routers and IBM network-attached S/390 mainframes. Cisco

has tweaked the IOS code that runs its devices to recognize priority headers on packets generated by the IBM S/390 IP stack. This offers an extra level of reliability for priority applications in an IP network.

For example, in tests the QoS modification

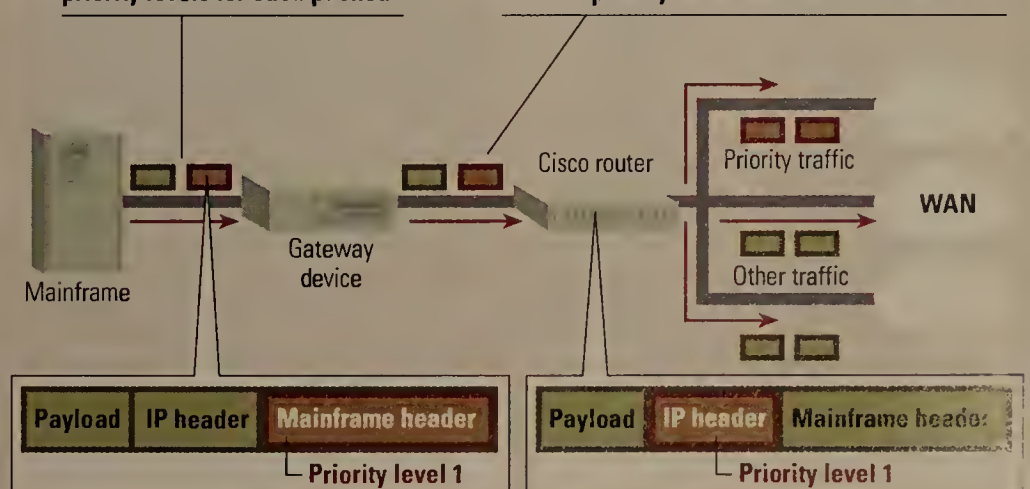
See **IBM**, page 26

### Traffic enforcer

**New software will let Cisco routers keep data priorities set by a mainframe.**

**1 Mainframe IP software sets data priority levels for each packet.**

**2 Cisco's IOS software then reads the packet and ensures priority levels are met across the WAN.**





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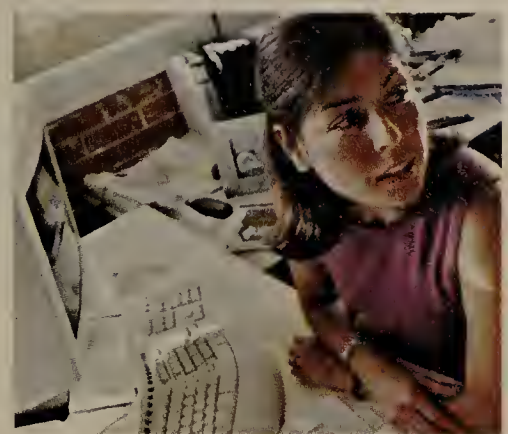


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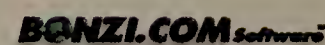
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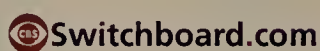
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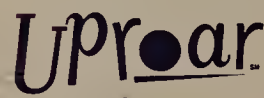
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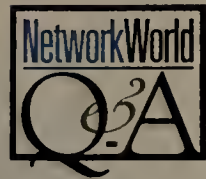
\* Media Metrix, September 1999

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# Firing up storage-area networks

Storage vendors look at management, applications, administration and the future of storage area networks.



When it comes to storage-area networks, sometimes the hype can get a little loud.

Network World's Storage Networking Town Meetings are meant to get beyond the exaggerations and find out what's really going

on in this important arena. Here we catch up with a recent SAN Town Meeting in Dallas, where the future of the SAN industry was a hot topic. At the roundtable were Doug Swords of BMC Software, Mark Knittel of Computer Network Technology (CNT), Gary Breder of EMC, Brad Harley of Hewlett-Packard, Vicki Vollmar of Hitachi Data Systems, John Camp of Legato and Dave Hill, storage analyst at consultancy Aberdeen Group. Network World's Executive Editor Doug Barney and Senior Editor Deni Connor led the questioning. By the way, if you missed the SAN Town Meetings last year, look for a new series starting June 14 in eight U.S. cities ([www.nwfusion.com/townmeeting](http://www.nwfusion.com/townmeeting)).

**We talk about voice, video and data convergence as being easier to manage and cheaper to buy and install. At the same time there's a bandwidth explosion. LANs are moving from 10M to 1000M bit/sec. If we're looking to converge data in a world where bandwidth is increasing at such a rate, why are we looking at separate Fibre Channel networks for our storage?**

**Knittel:** Part of the reason is quality of service — there is a very different orientation for building a network for client/server interaction vs. storage. Fibre Channel is a predominant technology for storage because it has speed, distance, I/O capability and [numerous] protocol support with a high-speed fabric underneath it. This harmony currently doesn't exist over on the LAN.

**How can users plan for the storage explosion? How do they decide what technology to move to, or whether they're going to use network-attached storage or outsourcing?**

**Swords:** You don't make an earthquake decision. You simply view the sheer size of the infrastructure that exists today in most companies and you evolve into it.

You may start off with a SAN that consists of two large storage devices that sit in your legacy machine room and are connected by a short piece of fiber cable. There may be a few applications or users accessing that

particular environment and it grows over time. You look at what's practical and move to technology that solves a particular problem you have.

**Vollmar:** Nobody can plan for the future. Folks should keep their options as open as possible. Users should go with building blocks that give them multiple attachments to storage, whether it's a switched fabric, arbitrated loop or direct-attached [storage]. Don't get locked into a proprietary architecture that will limit your options.

**How can users determine if the products they buy are interoperable and conform with open standards?**

**Knittel:** You have to look at openness and interoperability on two levels. Mostly we're talking about the physical connectivity layer — I don't think that's going to be a differentiating factor for long, because standards are coming into play. There's enough activity between the switch vendors and the different forms of connectivity. You'll always be able to interconnect an EMC drive to

any type of server. Just like it did in the LAN world, [physical connectivity] is going to go away as a problem.

Higher up in the protocol stack with management applications, you are going to have to do a reality check. You're not going to see much convergence there for a while, because that's how vendors differentiate. You won't, for instance, see EMC supporting a [remote data] connection to a Hitachi disk storage system on the other end any time soon.

**Which is better, Fibre Channel or SCSI?**

**Breder:** Both. The trick is, what's most appropriate for what you're trying to accomplish? You need to look at the structure of the bus, how the cache is designed and what the cache algorithms do for you. What's the overall aggregate speed of the bus? What's the aggregate speed into the drive? What's the speed through the host adapters? You need to decide when you put all those factors together, are you getting the functionality you need for today and the future?

Fibre Channel disk drives are appropriate for some and SCSI disk drives are appropriate for others. That answer won't be

the same five years from now. But five years ago people said you wouldn't see SCSI disk drives now. And SCSI still predominates.

**Knittel:** Fibre Channel is better for one reason — it's going to be as cheap as SCSI and its distance is extendible. For example, Fibre can run 32,810 feet between devices, whereas SCSI devices can only be separated by about 40 feet.

**Hill:** You'll continue to use SCSI if it's directly attached or internal to the server. As you

want greater distance or you want flexibility in putting together combinations that you're going to build into the SAN, and as the technology of the storage management software lets you build

time. Assess what your needs are, what benefit you're providing and you should be able to provide a monetary benefit that's more far-reaching than your IT expenditure.

**Does anyone agree with analyst estimates that most online storage will reside at storage service providers by 2005?**

**Vollmar:** There's going to be a growing populace of application service providers that will

provide storage services.

No one thinks though that outsourcing is going to be the predominant technology for most mission-sensitive, critical data. Storage utilities don't make sense for the general commercial population.

**Knittel:** I disagree. Over time, storage service providers are going to be a big factor in how storage solutions are deployed. First you'll take a backup copy of your data and put it somewhere else. It's less likely that you're going to take your primary copy of the data and accept the performance delay of having the application processor a long way away from your data.

But the more these things increase and the storage points of presence get closer to being ubiquitous, it will be easier and easier to do that. ■



Look at what's practical, says BMC's Doug Swords.

the SAN more effectively, then you'll start moving more to Fibre Channel.

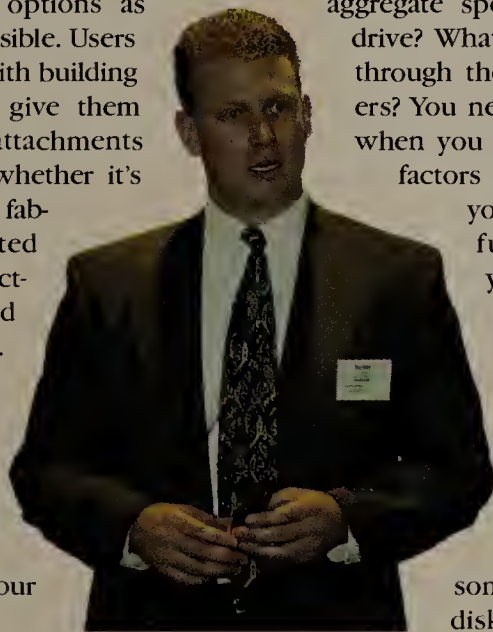
**In a company with 180 servers, 3.5 terabytes of disk, 1.3 terabytes of data and no storage management policy, how can a SAN help?**

**Breder:** You want to consolidate in a way that helps you to simplify how you manage, share and protect the data. Presume that [the data] is scattered all over the place, you've got a lot of people who spend part of their day managing, sharing, protecting all this.

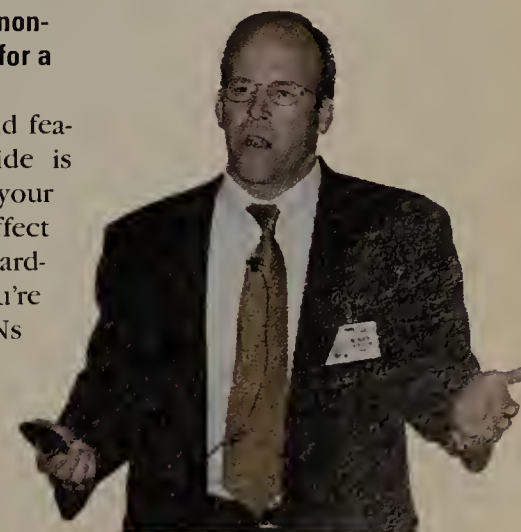
If you can optimize your resources through consolidation, it makes sense. If you can accelerate your response to the changes and needs in performance, capacities, sharing and backup requirements for these different applications that make up the 3.5 terabytes, then do it.

**How can we convince non-IT executives of the need for a storage infrastructure?**

**Harley:** The impact and features a SAN can provide is more far-reaching than your IT budget. SANs can affect your core business, regardless of what that is. If you're in e-commerce, SANs should increase your availability, your uptime and the functionality that you can provide to your customers. If you're looking at backup, SANs should improve your uptime and your restore



HP's Brad Harley says SANs can affect core business.



Gary Breder of EMC: Look carefully when debating SCSI or Fibre Channel.



# MMC net processor could slice switch port prices

Company's chip uses programmable processing and 'policy engines' to help control network features.

BY JIM DUFFY

SUNNYVALE, CALIF. — MMC Networks recently unveiled a network processor that company officials say will lower the cost of implementing policy-enabled switches for enterprise users.

MMC's nP3400 chip combines software programmable packet processing with a switch fabric in a single device. It is designed to be embedded on the printed circuit board of a switch or switch module.

Previously, MMC offered packet processing and switching in separate devices, which made switches more costly. The device also includes "policy engines," which will let users download instructions into switches for enabling or disabling network access, prioritizing traffic and other features.

MMC officials say the nP3400 will enable current customers, such as Cisco, Lucent and Nortel Networks, to offer policy-enabled wiring closet switches and switch modules for \$50 to \$75 per Fast Ethernet port. That's about half the price of today's Layer 2 Fast Ethernet switches, observers say, and more than half the cost of Layer 3 Fast Ethernet switch ports.

"We can offer full software program-

mability, full policy enablement at these price points," says Robin Melnik, MMC director of product marketing, adding that the nP3400 supports "layer anything" switching.

"MMC is not only looking at the tier 1 vendors, they're looking at some of these smaller guys that can really start building these boxes at a low cost," says Sean Lavey, research analyst at International Data Corp. in Framingham, Mass.

Lavey says the nP3400 will go up against Broadcom's StrataSwitch, which he says lets vendors build switches at \$100 per 100M bit/sec port.

Broadcom claims StrataSwitch enables per-port pricing as low as \$50 to \$70 (NW, Aug. 16, 1999, page 17).

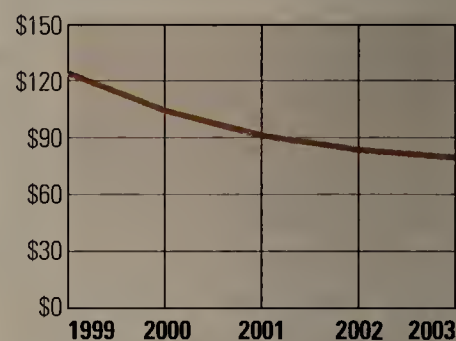
The nP3400 features two programmable 200-MHz RISC processors, a 4.4G bit/sec nonblocking switch fabric, and policy engines that support up to 128 rules, MMC says. The device also has a statistics engine for tracking detailed per-flow information.

The nP3400 is designed for stackable 10/100 switches, and 24- or 48-port 100M bit/sec Ethernet switches and switch modules with two Gigabit Ethernet uplinks. The device can also

## Watch for falling LAN prices

With its new chip package, MMC is looking to make LAN switching prices drop even faster than industry predictions.

Worldwide LAN switch market forecast (price per port)



SOURCE: DATAQUEST, SAN JOSE

be used in a variety of WAN products, such as cable, DSL, wireless, and T-1/T-3 and OC-3 to OC-48 access and aggregation systems; edge routers; virtual private network switches and firewalls; and optical metropolitan-area network systems.

The nP3400 costs under \$100 in volume quantities. Production shipments are slated for mid-2000.

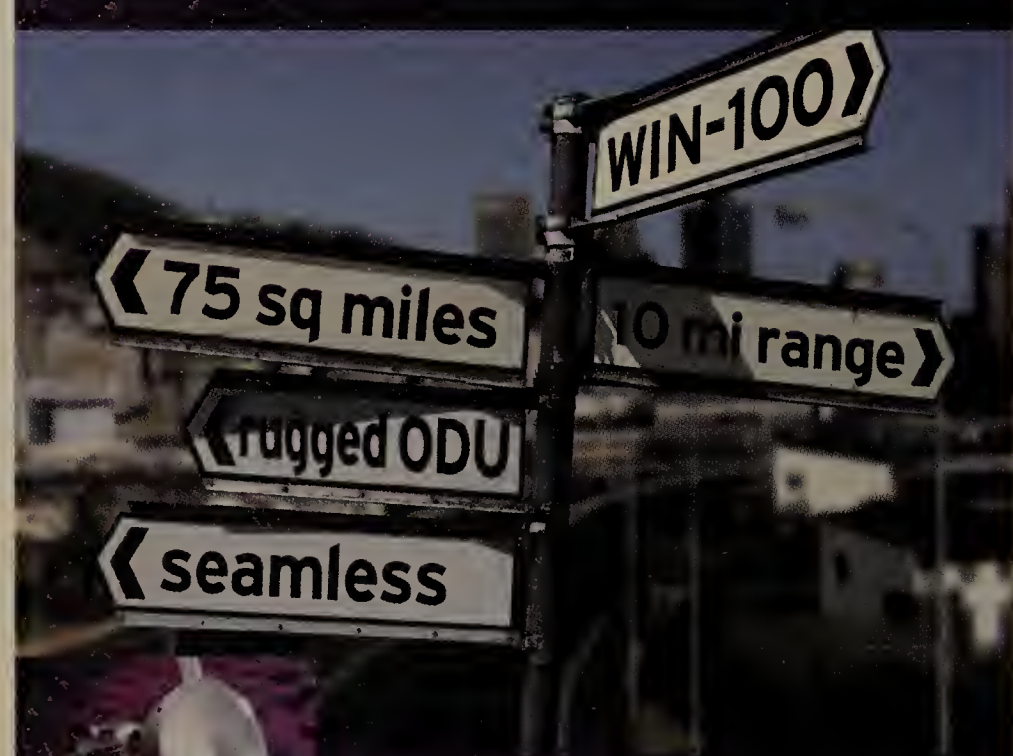
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## IBM,

continued from page 17

cations have reduced telnet traffic response times from 7 seconds to sub-second speed, Cisco says. Now a user running a key business transaction will have priority access to network bandwidth vs. a user just Web surfing, Cisco says.

IBM mainframe users may also find helpful a new IOS feature called Cisco MultiNode Load Balancing (MNLB). The MNLB technology lets Cisco devices automatically distribute IP traffic among an IBM Sysplex, or cluster of IBM mainframes.

Overseeing the MNLB devices and traffic is a dedicated Cisco service manager appliance. Using an agent, this appliance communicates with the IBM cluster's workload manager, software that gathers data on mainframe CPU utilization cycles. Armed with this information, the appliance matches a given router workload to the most appropriate CPUs on a mainframe.

Should there be a sudden surge of activity in the network, for example during a peak hour of trad-

ing at a brokerage house, the MLNB will dynamically start load-balancing the IP traffic to prevent overload and session outage. It can also perform high-speed failover in case a mainframe crashes.

Shared Medical Systems, which supplies IS services to 5,000 health companies worldwide, has done everything possible from an operational approach to improve network availability and traffic speeds, says Dan Emig, an IS manager. The next step is to consider new technologies to boost performance — such as those IBM and Cisco have announced.

The company has eight IBM S/390 boxes and about 1,000 Cisco routers in its net to cater to the 300,000 users who log on daily to Shared Medical's network. The company is now considering exploiting these new IOS features, Emig says. The IBM-Cisco alliance has been beneficial: Users are able to get a single clear message from both companies, he says.

The IP prioritization and MNLB features are available now as part of IOS 12.05 t.

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Internetworking Monitor . Kevin Tolly

## SCO GOES HUNTING FOR CITRIX CUSTOMERS

**U**ntil now, UnixWare company The Santa Cruz Operation (SCO) has been little-known to NT aficionados. That situation is about to

change. As of today, SCO has declared open season on NT thin-client provider Citrix Systems.

SCO's Tarantella Enterprise II, ship-

ping this week, expands the company's thin-client offerings to include NT applications — an area monopolized by Citrix and its primary

licensee, Microsoft.

The move is bound to garner attention — if for no other reason than the economic implications. SCO has loaded both barrels with a 10-for-1 Citrix MetaFrame license replacement program. Growing enterprises that decide to dance the Tarantella will reap a significant financial windfall. Want to trade in those 50 Citrix licenses? SCO will replace them with 500 of its own.

I've scoured the substantial literature available at SCO's Tarantella site ([tarantella.sco.com](http://tarantella.sco.com)), and it certainly appears that the company has a credible offering.

Like Citrix, SCO implements what it terms a "thin display engine" as a Java client as well as a "native" client for environments such as Windows 3.1, where running Java is painful or impossible.

While citing no specifics, SCO claims that dial-up performance via Tarantella is comparable to running applications locally across a fast LAN. Citrix makes the identical claim. Feature-for-feature, this product is positioned squarely against Citrix. But there are some critical differences.

Like Citrix's MetaFrame, Tarantella is used in conjunction with the basic Windows NT/2000 Terminal Server Edition (TSE). TSE is built using base thin-client code that Microsoft licenses from Citrix. The product communicates with TSE using the proprietary Microsoft Remote Desktop Protocol (RDP). Unlike Citrix, whose engineers developed RDP, SCO engineers reverse-engineered the protocol.

Microsoft, it seems, was in no rush to work out a deal with the only credible competitor to Citrix. To its credit, SCO refused to be stonewalled by Microsoft.

Still, given the relatively mysterious nature of RDP, Microsoft and Citrix will have no problem using SCO's "bootleg" code to instill fear, uncertainty and doubt in any potential converts.

For its part, SCO should promote what it has done and seek to demystify RDP. Heck, the company should even post its decodes and offer them up to vendors of network analysis tools. I believe that Tarantella's success or failure will hinge upon how SCO handles the RDP issue.

There is another significant issue that is buried deep in the SCO material. Whereas the Citrix server-side code is coresident with TSE, Tarantella is not. It runs on a different server.

In any case, Citrix cannot afford to ignore SCO's play. Before long, the hunter may become the hunted.

*Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, [ktolly@tolly.com](mailto:ktolly@tolly.com) or [www.tolly.com](http://www.tolly.com)*

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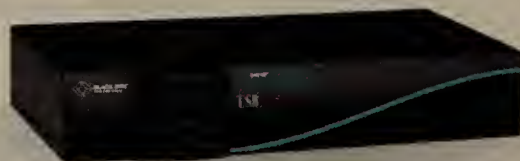
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# Carriers & ISPs

**The Internet, Extranets, Interexchange  
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## Briefs

FlowPoint Corp. is shipping a free firewall with its digital subscriber line (DSL) routers. The routers, which are installed at customer sites, are the link between customer networks and DSL lines that connect to the Internet. FlowPoint routers are used by Covad Communications, a service provider specializing in DSL. The firewall used to cost \$299. Upgrades for current FlowPoint customers are available at [www.flowpoint.com](http://www.flowpoint.com).

Breakaway Solutions, an application service provider (ASP) in Boston, is teaming with InterNap, an ISP in Seattle, to offer Breakaway customers dedicated Internet access services. InterNap inked a deal last week with Breakaway, the first ASP to sign on with the ISP. Breakaway also announced it has opened its 11th data center in Chicago. Breakaway is among a handful of ASPs building their own data centers to support application rental services.

Darwin Networks has crafted a unique deal to push DSL into areas that might otherwise be overlooked. Darwin uses DSL to support its business selling high-speed Internet access to hotels that in turn resell that access to guests. The trouble is, some of those hotels are in towns too small to make it worthwhile for the local phone company to install switching office DSL gear. Darwin has a deal in the South to lease DSL switching office gear to BellSouth so BellSouth can sell Darwin the DSL services it needs. BellSouth also gets to use the equipment to sell DSL service to other customers. Over time, BellSouth will own the gear.

## Users urge court to knock out tariffs

*Carrier practices and even Biblical verses hauled out in fight over 'filed-rate doctrine.'*

BY DAVID ROHDE

WASHINGTON, D.C. — A federal court will soon decide whether enterprise users can fully rely on the terms of their negotiated term contracts with carriers or must remain at the mercy of sudden changes in tariff rates.

On March 14 the U.S. Court of Appeals for the District of Columbia will hold a hearing on a long-standing lawsuit by MCI WorldCom against the Federal Communications Commission.

The lawsuit seeks to overturn a series of FCC decisions beginning in 1996 that have tried to end the practice of filing tariffs — official documents carrying prices and conditions of service — by long-distance carriers.

### A one-way street?

**According to user advocates, long-distance carriers have recently utilized the "filed-rate doctrine" to:**

- Change the monthly universal service fee with little or no notice.
- Give themselves the right to impose other monthly fees not anticipated in user contracts.
- Change prices on voice and data services even before the user's contract has expired.

Though carriers usually oppose regulation on themselves, MCI WorldCom, supported by AT&T and Sprint, says it should have the right to continue filing FCC tariffs, because they provide publicly available rate information.

But a bloc of en-

terprise user groups says the carriers have another motive in mind. They say the carriers want to continue filing tariffs because of a legal principle dating back to the 19th century called the filed-rate doctrine.

Under the filed-rate doctrine, tariff filings take legal precedence over private contracts between two parties. As a result, a carrier can file a tariff rate change for a voice or data service with as little as one day's notice, and the rate change will go into effect even for users in the middle of long-term contracts. The filed-rate doctrine for industries that employ tariffs was upheld as recently as last year by the Supreme Court, in an unrelated case involving AT&T and a telecom reseller.

The user groups last month sided  
See **Hearing**, page 35

## Visual Networks looks to expand net management

BY TIM GREENE

ROCKVILLE, MD. — Visual Networks wants to do more than keep an eye on the performance of your frame relay and ATM circuits: It also wants to make gear that automatically fine-tunes the performance and reliability of service-provider networks.

"The customers for these new products will be service providers, but the real beneficiary is the enterprise, because they're going to end up with higher-quality services," says Scott Stouffer, Visual Networks' president and CEO.

Visual is known for Visual UpTime hardware and software, which tracks the performance of frame relay and ATM virtual circuits so customers and carriers can measure whether service-level agreements are being met.

But Visual wants to expand into software that also manipulates routers and switches to respond to troubles that the monitoring equipment detects. For example, if a network-based application is heavily used, service management software might borrow bandwidth from a lower-priority application to keep response time down.

To accomplish the company's goals,

Stouffer says, Visual plans to go on a spending spree, buying up other companies to get needed technology. "Visual has 20% of the pieces now. This is a two-year vision, and we're saying we're going to go out and try to pull together all the pieces," Stouffer says.

The parts Visual needs to acquire fall into five categories: general-purpose reporting software; event management software; server and application monitoring software; policy configuration management software; and software to tie all the parts together into a single platform.

The general-purpose event management software would gather data from routers and servers and make sense of it to generate alarms. Stouffer will not say what companies Visual is looking at, but he says



**"There is no reliable method today to manage IP infrastructures. It's very chaotic and labor-intensive, so it can't scale."**

Scott Stouffer, president and CEO of Visual Networks

MicroMuse and Avesta are examples of companies in this area.

General-purpose reporting software collects data and produces long-term reports to spot trends in network use. Concord, DeskTalk and InfoVista sell this type of product.

Server and application monitoring tracks transaction response time at the application layer. Companies making such software include Ganymede, Response Networks, First Sense and Aptitude.

Policy configuration management enables automatic manipulating of routers, switches and servers rather than just monitoring them. Orchestream, IP Highway and Syndesis products fit in this category.

Visual will develop APIs on its own to tie all the pieces together, Stouffer says.

See **Visual**, page 35



# GTE Internetworking bundles security, 'Net services

BY DENISE PAPPALARDO

WASHINGTON, D.C. — Taking a small departure from its traditional enterprise user focus, GTE Internetworking this week is rolling out an all-in-one managed security service for small to midsize business users ComNet 2000.

GTE Internetworking's Secure BizConnect service offers companies with fewer than 500 employees 128K bit/sec to 1.544M bit/sec dedicated Internet access, which includes a Watchguard Technologies Firebox II security appliance, a Cisco 1605 router and round-the-clock network monitoring.

Secure BizConnect is really the coupling of GTE Internetworking's Security Advantage managed firewall and BizConnect managed Internet access services, which the ISP still sells

separately. By bringing the offerings together, it's easier for users to order and monitor the service because GTE Internetworking is providing a single invoice for all aspects of the Secure BizConnect offering.

## GTE's BizConnect service package

**GTE Internetworking is bundling its dedicated Internet access and security services for small to midsize business users. The pricing also includes a one-time setup fee of \$1,495.**

Secure BizConnect service	Configuration change requests per month	128K to 256K bandwidth
Bronze	Up to 2	\$1,375
Silver	Up to 2	\$1,470
Gold	Up to 12	\$1,650

Only 20% of GTE Internetworking's customers are small to midsize businesses, primarily because the ISP has focused on offering services to Fortune 1000 businesses, says Tim Bowen, product marketing manager

for virtual private networks and Internet security services at GTE Internetworking. But GTE Internetworking expects its small-business customer base to grow almost 15% by offering users bundled cost-effective services.

Secure BizConnect is 5% less expensive than buying GTE Internetworking's managed firewall and dedicated Internet access services separately, Bowen says.

And Secure BizConnect includes a Cisco router, which is not included in the flat price of GTE Internetworking's standard BizConnect service.

GTE Internetworking ships its Secure BizConnect customers a Firewall II security appliance that is preconfigured with the customer's network access parameters along with a preconfigured Cisco 1605 router. Users will be able to simply plug the devices

in to their network and start working, Bowen says. The Firewall II device also comes with an analog telephone line port that is used by GTE Internetworking to take the device down if a network intrusion is detected.

Secure BizConnect customers get a monthly security incident report. Customers also can access the ISP's Stats Advantage bandwidth utilization and performance Web page to get an idea of how much traffic is being sent and received over their dedicated Internet access links.

Secure BizConnect is available now, with pricing starting at \$1,375 per month. GTE Internetworking offers business users several service options that range from a 128K bit/sec to 256K bit/sec dedicated Internet access link with two network configuration changes per month, to a dedicated T-1 with up to 12 network configuration changes per month.

GTE Internetworking: [www.bbn.com](http://www.bbn.com).

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**Hearing,**  
continued from page 33

with the FCC in a brief filed with the appeals court by Levine, Blaszk, Block & Boothby, a Washington, D.C., law firm. The user groups include the New York Clearing House Association — a group of leading commercial banks — and the Ad Hoc Telecommunications Users Association, a cross-vertical-industry coalition.

Carriers aren't filing sneaky tariff rate increases on per-minute tolls as often as they used to, the user lawyers concede. Instead, many of what they call "abuses" of the filed-rate doctrine are now coming on the surcharges that appeared after the Telecommunications Act of 1996.

For example, late last year AT&T quietly increased its universal-service surcharge on certain interstate traffic from 5.9% to 6.6% via a tariff filing after the government changed its universal-service funding formula, says Colleen Boothby, one of the user groups' attorneys.

For all the potential high-money stakes of the case, the court's decision

may turn on the dictionary definition of a single word in the 1996 telecom act. The FCC based its decision to end tariffs on the fact that the 1996 law gives the FCC the right to "forbear" certain regulations to speed competition in the market.

MCI WorldCom and its supporters argue that the FCC's ability to "forbear" is permissive — it can allow carriers to stop filing tariffs but can't force them to do so.

The FCC, backed by the user groups, says if they "forbear" requiring tariffs, that means they can forbid them altogether. The user groups' court brief even hauled out a Biblical quotation to support this point — in Ezekial 24:17, Ezekial is ordered: "Forbear to cry, make no mourning for the dead."

The users' brief also ridicules a charge by the carriers in their court brief that a lack of tariffs would force them to send contract terms to all users — residential and business — and make them notify customers of any changes in their rates, terms and conditions. Such a complaint "reveals in a profound way how disconnected the carriers have become from the

core principles of a market economy," the user attorneys say. They note that this is precisely how credit card companies deal with their tens of millions of customers.

A final ruling from the appeals court is due this spring or summer. Neither the FCC nor state regulators have proposed to de-tariff local carriers, but all sides agree that local tariffs are scrutinized by both states and the FCC more carefully than long-distance carriers tariffs, and are sometimes even disallowed. ▀

**Visual,**  
continued from page 33

While today Visual sells 40% of its frame relay and ATM monitoring gear to enterprises, it expects this figure will dwindle to zero as enterprises outsource monitoring to service providers.

Stouffer believes it will be some time before customers learn to trust service providers with hosting applications. The software Visual wants to provide will make those networks reliable enough to give customers that confidence, he claims.

Currently, carriers must use separate software platforms if they want to offer the range of monitoring and management Stouffer describes.

"There is no reliable method today to manage IP infrastructures. It's very chaotic and labor intensive, so it can't scale," Stouffer says.

He expects encouragement from network giants such as Cisco, Lucent and Nortel. "Those guys have decided they don't want to be in this space but want to make sure somebody legitimate is," Stouffer says.

Visual: [www.visualnetworks.com](http://www.visualnetworks.com)

[www.nwfusion.com](http://www.nwfusion.com)

## TIME TRAVEL

*"In a move of stunning breadth, the FCC last week proposed to end 62 years of rate regulation by wiping out tariffs for the entire long-distance industry. The proposal would, for the first time, free up carriers and users to negotiate at will the rates and terms for network services."*

Network World, March 25, 1996

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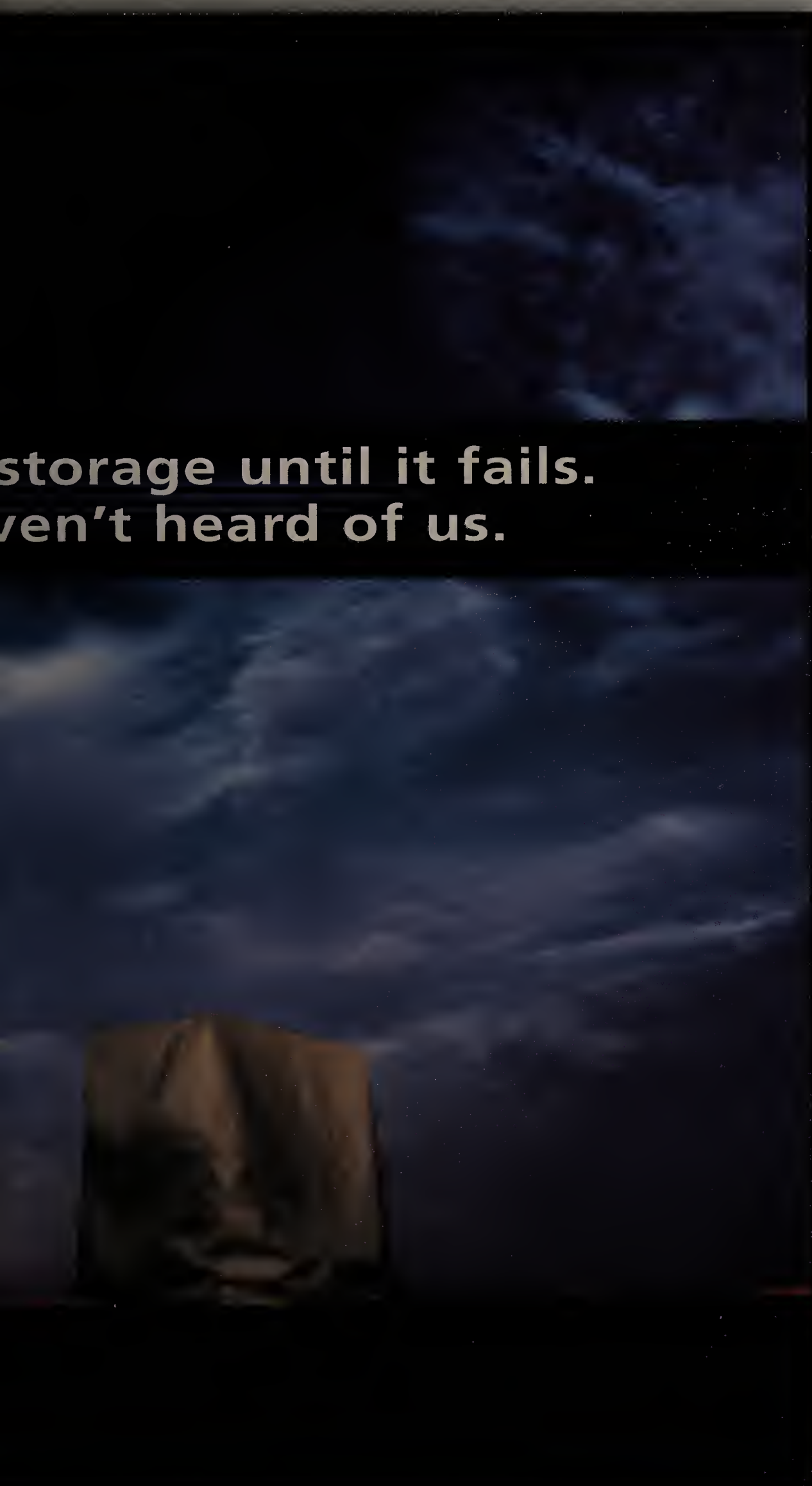


The image shows the front cover of an old, worn book. The main part of the cover is a dark, mottled brown or black color with a rough, textured surface. The spine and the corners are reinforced with a lighter, possibly leather or cloth material, which also shows signs of wear and discoloration. The overall appearance is that of a well-used, antique volume.

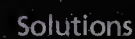
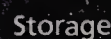
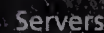
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A large, light-colored, rectangular block of stone or concrete stands prominently in the foreground, casting a shadow. The background features a dramatic sky with dark, swirling clouds and a body of water visible in the distance.



A dark, stormy sky with a lightning bolt striking a large, dark, rectangular object in the foreground. The object appears to be a piece of equipment or a structure, possibly a server rack, covered in a dark, textured material. The lightning bolt is bright and jagged, illuminating the scene. The overall mood is ominous and dramatic.

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Eye on the carriers . David Rohde

## UNFINISHED BUSINESS FOR THE BELLS AND DSL

**W**hen the history of high tech is written, the second half of 1999 will be remembered as the era of massive and occasionally mindless con-

sumer e-commerce advertising.

But it's also likely that the same period will be known for something else — the time when DSL deployment began

in earnest. And the fact that DSL got real just when the government began letting Bell companies into long-distance is creating tension among the Bells, their com-

petitors and regulators.

Last month the Federal Communications Commission authorized Bell Atlantic to sell long-distance in New York state. The 244-page decision, with — I kid you not — 1,387 footnotes, describes in detail how Bell Atlantic has improved its performance providing local loops to competitors in New York. That's what the law requires before a Bell can go into long-distance.

But the FCC analysis — based on a test by KPMG and backed by data from New York regulators — is overwhelmingly concerned with plain old telephone service (POTS) and T-1s.

Because the FCC must rule on long-distance applications within 90 days, it requires Bells to present a "snapshot" of their local-competition systems, rather than waves of evidence as in the usual FCC proceeding. Thus the problem. When Bell Atlantic made its application in September, it had just begun to provide DSL-capable loops to competitors — seven in June, 56 in July, 449 in August and 653 in September, the FCC says. On such a small sample, huge disputes arose.

Bell Atlantic told the FCC it only missed 7% of DSL installation dates in August and 3% in September. But DSL provider Covad claims that through August, Bell Atlantic only provided loops on-time 29% of the time. Bell Atlantic retorts that sometimes Covad's orders are filled with mistakes.

When it came to POTS, the FCC report did a good job resolving statistical disputes, showing how sometimes it's poor customer service on the part of competitive local exchange carriers that causes local orders to get botched. But when it comes to DSL, the regulators admit they don't know who's to blame.

Another problem: DSL carriers must have access to Bell Atlantic's Loop Qualification Database. After all, Covad can't promise DSL if the line is filled with analog-era junk that would degrade the digital quality. The FCC believes DSL carriers have adequate access to the database. But it admits that Bell Atlantic is still in the process of surveying its entire loop inventory for DSL capability.

The FCC says all future Bell long-distance applications will have to provide rigorous DSL provisioning data. Maybe that's unfair. Bell Atlantic has hardly been a DSL leader, and by sitting on the technology, it managed to win its New York long-distance bid without having to prove it can provide DSL fairly to all.

But it's time to move on, and anyway the FCC's new demand will apply when Bell Atlantic files for long-distance in its 12 other states. Want to read the New York decision? It's available at [www.fcc.gov/Bureaus/Common\\_Carrier/Orders/1999/fcc99404.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Orders/1999/fcc99404.pdf). Think you'll skip it? Not to worry. That's what I'm here for.

*Robde is a senior editor with Network World. He can be reached at [drobde@nw.com](mailto:drobde@nw.com).*

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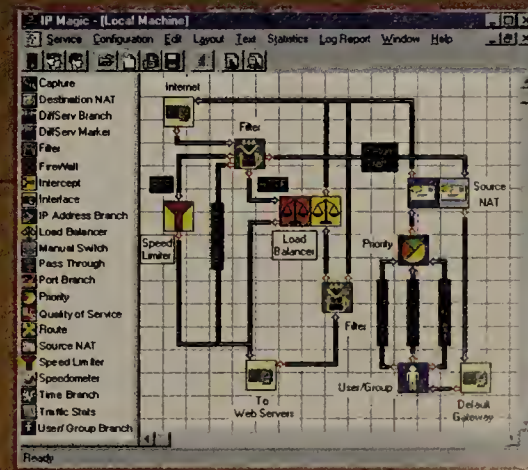
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1. What is the principal business activity at your location? (check ONE only)

- 01. Manufacturing (other) 02. Finance/Banking 03. Insurance/Real Estate/Legal 04. Health Care Services 05. Hospitality/Entertainment/Recreation 06. Media/TV/Cable/Radio/Print 07. Retail/Wholesale Trade/Business Services 08. Transportation 09. Utilities/Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
- 10. Education 11. Government 12. Military 13. Aerospace 14. Consulting (Independent) \* 15. Carriers/Service Providers 16. Internet Service Provider (ISP) 17. Manufacturing (Computer/Communications/OEM) 18. Resellers of Computer/Network Products (VARs,VADs)\*
- 19. Systems/Network Integrators\* 20. Distributors (Computer/Communications)\* 21. Other (please specify)

2. P: What is your primary job function? (check ONE only) S: What is your secondary job function? (check ALL that apply)

- |  |                             |                               |   |   |                           |
|--|-----------------------------|-------------------------------|---|---|---------------------------|
| P  | S                           | P                             | S                                       | P   | S                         |
| 1. Network Management  | 2. LAN Management           | 3. Datacom/Telecom Management | 4. IS/IT/MIS/CIO/CTO/Systems Management | 5. Internet/Intranet/e-Commerce Mgmt, Webmaster | 6. Engineering Management |
| 7. Corporate Management (CEO, COO, CFO, Pres., VP, Dir., Mgr.) | 8. Consultant (Independent) | 9. Other (please specify)     |   |   |                           |

3. What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of? (Please print the appropriate number code on the line next to each product category. Please complete ALL categories A-N.)

- |                                   |  |                                    |
|-----------------------------------|--|------------------------------------|
| 1. \$100 Million or more          | A. Large Systems (Mainframes/Minis)            | G. Internetworking                 |
| 2. \$50 Million to \$99.9 Million | B. Desktops (Micros/Laptops/Workstations/PDAs) | H. Internet                        |
| 3. \$25 Million to \$49.9 Million | C. Servers                                     | I. Intranet                        |
| 4. \$10 Million to \$24.9 Million | D. LANs  | J. Extranet/Ecommerce              |
| 5. \$1 Million to \$9.9 Million   | E. WAN Equipment                               | K. Remote Access                   |
| 6. \$100,000 to \$999,999         | F. Carrier Services                            | L. Peripherals (including storage) |
| 7. \$50,000 to \$99,999           |  | M. Software                        |
| 8. Under \$50,000                 |  | N. Service/Support                 |
| 9. None of the above              |  |                                    |

4. What is the total number of sites for which you have purchase influence? (check ONE only)

1. 100+ 2. 50 - 99 3. 20 - 49 4. 10 - 19 5. 2 - 9 6. 1 7. None

5. What is the total number of Servers/Clients/LANs installed/planned at your location/ in your entire organization? (check ONE box in each column)

SERVERS		CLIENTS		LANs	
At Location	Entire Org.	At Location	Entire Org.	At Location	Entire Org.
A	B	C	D	E	F
1. 50,000+		1. 50,000+		1. 50,000+	
2. 10,000 to 49,999		2. 10,000 to 49,999		2. 10,000 to 49,999	
3. 1,000 to 9,999		3. 1,000 to 9,999		3. 1,000 to 9,999	
4. 100 to 999		4. 100 to 999		4. 100 to 999	
5. 50 to 99		5. 50 to 99		5. 50 to 99	
6. 10 to 49		6. 10 to 49		6. 10 to 49	
7. 1 to 9		7. 1 to 9		7. 1 to 9	
8. none		8. none		8. none	

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

- |   |                                       |
|---|---------------------------------------|
| A. Scope (check ONE only)                 | B. Involvement (check ALL that apply) |
| CORPORATE                                 | 1. Create Network/IT Strategy         |
| 1. Entire Enterprise/Multiple Enterprises | 2. Recommend/Specify Brand            |
| 2. Division/Multiple Divisions            | 3. Approve Purchase                   |
| 3. Department                             | 4. Evaluate Products/Services         |
| 4. None                                   | 5. Determine the Need                 |
|   | 6. None                               |

7. What is the estimated number of employees at your location/in entire organization? (check ONE in each section)

- |                      |                         |
|----------------------|-------------------------|
| A. At your location: | B. Entire organization: |
| 1. Over 20,000       | 1. Over 20,000          |
| 2. 10,000 - 19,999   | 2. 10,000 - 19,999      |
| 3. 5,000 - 9,999     | 3. 5,000 - 9,999        |
| 4. 2,500 - 4,999     | 4. 2,500 - 4,999        |
| 5. 1,000 - 2,499     | 5. 1,000 - 2,499        |
| 6. 500 - 999         | 6. 500 - 999            |
| 7. 250 - 499         | 7. 499 or less          |
| 8. 100 - 249         |                         |
| 9. 99 or less        |                         |

8. Please indicate the Internet/Intranet/LAN/WAN products/services that you are currently involved in purchasing or plan to purchase (check ALL that apply)

- | A. Currently involved in purchasing         |  | B. Plan to purchase                       |     |
|---|--|---|-----|
| INTERNET/INTRANET                           |  |   |     |
| A   | B  | A   | B   |
| 01. VPN Equipment                           | 07. Voice/Video Over IP (IP Multicast Routing) | 12. Management/Monitoring Software        |     |
| 02. VPN Services                            | 08. Internet Services                          | 13. Web Based Management Tools            |     |
| 03. Firewalls/Security/Encryption           | 09. Web Hosting                                | 14. Web Based Collaboration/Groupware     |     |
| 04. Electronic Commerce                     | 10. Host Access                                | 15. Caching/Load Balancing Products       |     |
| 05. Web Servers/Software                    | 11. Web Development Tools                      | 16. Other Internet/Intranet               |     |
| 06. Web Enabled Call Center Tools           |  |   |     |
| LOCAL-AREA NETWORKS/INTERNETWORKING         |  |   |     |
| A   | B  | A   | B   |
| 17. Local-Area Networks                     | 25. Layer 2 Switches                           | 33. UPS                                   |     |
| 18. Network Operating System Software (NOS) | 26. Layer 3 Switches                           | 34. Network Interface Cards (NICs,PCMCIA) |     |
| 19. Intel Based Servers                     | 27. Layer 4 Switches                           | 35. Hubs/Intelligent Hubs/Stackable Hubs  |     |
| 20. Intel Based Multiprocessor Servers      | 28. ATM Switches                               | 36. Cables,Connectors, Baluns             |     |
| 21. RISC Based Servers                      | 29. Token-Ring Switches                        | 37. SNMP Platform                         |     |
| 22. Clustered Servers                       | 30. Network Storage (NAS, SANs)                | 38. Management Frameworks                 |     |
| 23. Print Servers                           | 31. Storage/Backup (Optical, Disk, Tape, RAID) | 39. Other LAN/Internetworking             |     |
| 24. Routers                                 | 32. Network Test/Diagnostic Tools              |   |     |
| WAN EQUIPMENT & SERVICES                    |  |   |     |
| A   | B  | A   | B   |
| 40. Modems                                  | 46. Remote Access Services                     | 53. PBXs                                  |     |
| 41. Cable Modems                            | 47. Wireless Data Equipment/Services           | 54. Videoconferencing                     |     |
| 42. Asynchronous Transfer Mode (ATM)        | 48. ISDN Equipment/Services                    | 55. Managed LAN/Router Services           |     |
| 43. Frame Relay Equipment Including FRADS   | 49. FT-1/T-1/T-3 Services                      | 56. Fax Servers/Services                  |     |
| 44. Frame Relay Services                    | 50. xDSL Services/Products                     | 57. Other WAN Equipment/Services          |     |
| 45. Remote Access Products                  | 51. Diagnostic/Test Equipment                  |   |     |
|   | 52. DSU/CSU                                    | None of the above (1 - 57)                | 58. |

9. Please indicate the Network hardware/software/services that you are currently involved in purchasing or plan to purchase: (check ALL that apply)

- | A. Currently involved in purchasing   |   | B. Plan to purchase             |     |
|---|---|---------------------------------|-----|
| COMPUTERS/PERIPHERALS   |   |                                 |     |
| A   | B   | A                               | B   |
| 01. Laptops/Notebooks/PDAs  | 05. Storage/Backup (Optical,Disk,Tape,RAID)             | 08. Minis                       |     |
| 02. PCs   | 06. Printers  | 09. Mainframes                  |     |
| 03. Windows Terminals/Thin Clients  | 07. Printer/Fax/Copier Hybrids (Multifunction Printers) | 10. Fax/Modem Boards            |     |
| 04. Workstations  |   | 11. Memory/Chips/Boards/Cards   |     |
|   |   | 12. Other Computers/Peripherals |     |
| SOFTWARE/APPLICATIONS   |   |                                 |     |
| A   | B   | A                               | B   |
| 13. Network Management  | 21. E-Mail  | 28. Site Metering Tools         |     |
| 14. Systems Management  | 22. Enterprise Resource Planning (ERP)                  | 29. Data Warehousing            |     |
| 15. Security  | 23. EDI   | 30. Anti Virus Software         |     |
| 16. Directory Services  | 24. Desktop Videoconferencing                           | 31. Multimedia                  |     |
| 17. Operating Systems   | 25. Imaging   | 32. Y2K Conversion Software     |     |
| 18. Applications Development Tools  | 26. Middleware/Serverware                               | 33. Helpdesk                    |     |
| 19. Database Management/RDBMS   | 27. Document Management                                 | 34. Other Software/Applications |     |
| 20. Groupware   |   |                                 |     |
| SERVICES  |   |                                 |     |
| A   | B   | A                               | B   |
| 35. BPO (Business Process Outsourcing incl. Financial Services, HR, Logistics etc.) | 36. Applications Outsourcing                            | 39. Education/Training Services |     |
|   | 37. Call Center Outsourcing                             | 40. Other Services              |     |
|   | 38. Systems Integration/Consulting                      |                                 |     |
|   |   | None of the above (1 - 40)      | 41. |

10. Please indicate the platforms that are currently installed/planned: (check ALL that apply)

- | A. Currently installed              |                             | B. Planned for purchase              |     |
|-------------------------------------|-----------------------------|--------------------------------------|-----|
| NETWORK PROTOCOLS                   |                             |                                      |     |
| A                                   | B                           | A                                    | B   |
| 01. TCP/IP                          | 04. Novell IPX/SPX          | 07. NFS                              |     |
| 02. IPv6                            | 05. APPC/APPN/LU 6.2        | 08. SNMP                             |     |
| 03. SNA                             | 06. NETBIOS/NETBUEI         | 09. Other Network Protocols          |     |
| LAN/WAN ENVIRONMENT                 |                             |                                      |     |
| A                                   | B                           | A                                    | B   |
| 10. Gigabit Ethernet                | 16. IP Switching            | 22. Wireless                         |     |
| 11. Switched Ethernet               | 17. Layer 3/4 Switching     | 23. DSL                              |     |
| 12. Fast Ethernet                   | 18. FDDI                    | 24. ISDN                             |     |
| 13. Ethernet                        | 19. 100Base-T               | 25. Frame Relay                      |     |
| 14. ATM                             | 20. 10Base-T                | 26. Private Line T1, T3, FT-1, SONET |     |
| 15. Token Ring/Token Ring Switching | 21. Fibre Channel           | 27. Other LAN/WAN Environment        |     |
| NETWORK OPERATING SYSTEM            |                             |                                      |     |
| A                                   | B                           | A                                    | B   |
| 28. Windows NT/Windows 2000         | 32. LINUX                   | 35. IBM (LAN Server)                 |     |
| 29. Novell (NetWare 5.X)            | 33. Microsoft (LAN Manager) | 36. Other Network Operating System   |     |
| 30. Novell (NetWare 4.X)            | 34. Banyan (Vines)          |                                      |     |
| 31. Novell (NetWare 2.X,3.X)        |                             |                                      |     |
| COMPUTER OPERATING SYSTEM           |                             |                                      |     |
| A                                   | B                           | A                                    | B   |
| 37. NT Workstation                  | 42. LINUX                   | 47. Digital VMS                      |     |
| 38. Windows 2000                    | 43. DOS                     | 48. Macintosh                        |     |
| 39. Windows 98/95/3.1               | 44. OS/2 OS/2 WARP          | 49. Other Computer Operating System  |     |
| 40. Intel based UNIX                | 45. OS/400                  |                                      |     |
| 41. RISC based UNIX (incl. SOLARIS) | 46. IBM MVS/VM/VSE/ESA      | None of the above (1- 49)            | 50. |

11. Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

- |                              |                          |                     |
|------------------------------|--------------------------|---------------------|
| A - Mainframes (Large Scale) | B - Minis (Midrange)     | C - Workstations    |
| 1. IBM                       | 1. IBM RS/6000           | 1. Sun Microsystems |
| 2. Other                     | 2. IBM AS/400            | 2. H-P              |
|                              | 3. Digital/Tandem/Compaq | 3. Digital/Compaq   |
|                              | 4. Unisys                | 4. IBM              |
|                              | 5. H-P                   | 5. Silicon Graphics |
|                              | 6. Other                 | 6. Other            |

12. What is the estimated gross revenue of your entire company/institution? (check ONE only)

- |                                     |                                     |                          |
|-------------------------------------|-------------------------------------|--------------------------|
| 1. \$20 Billion or More             | 5. \$100 Million to \$499.9 Million | 9. \$4.9 Million or less |
| 2. \$10 Billion to \$19.9 Billion   | 6. \$50 Million to \$99.9 Million   | 10. None of the above    |
| 3. \$1 Billion to \$9.9 Billion     | 7. \$10 Million to \$49.9 Million   |                          |
| 4. \$500 Million to \$999.9 Million | 8. \$5 Million to \$9.9 Million     |                          |

13. For which areas outside of the US do you have purchase influence? (check ALL that apply)

- |           |                  |                |           |
|-----------|------------------|----------------|-----------|
| 1. Europe | 3. South America | 5. Middle East | 7. Canada |
| 2. Asia   | 4. Australia     | 6. Africa      | 8. None   |



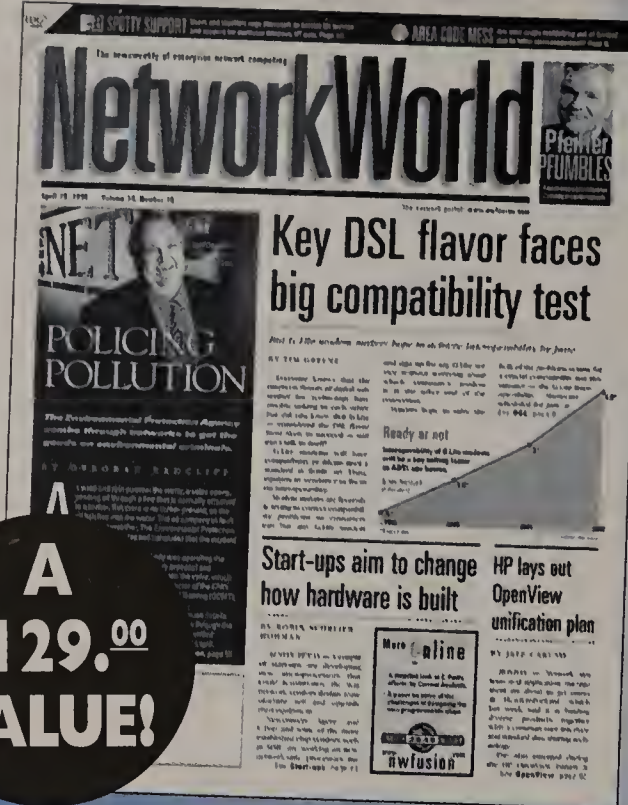
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## Briefs

**Hewlett-Packard** last week launched software designed to eliminate known security holes in Windows NT-based Web servers. Typical out-of-the-box NT installations contain hundreds of potential security breaches against which users can protect themselves by using the new software, called Praesidium WebEnforcer, HP officials say.

HP also launched a subscription service called HP Security-Update to accompany Praesidium WebEnforcer. The service keeps IT managers up-to-date on new NT vulnerabilities as they are discovered.

Praesidium WebEnforcer is available now and costs \$3,000 per server. The SecurityUpdate subscription service, which includes technical support, costs \$700 per year.

HP: [www.hp.com](http://www.hp.com)

**Secure Computing** has been awarded a contract from the National Security Agency to develop a secure version of Linux by mid-year. The company plans to modify the Linux kernel in such a way that applications and services would be protected by getting segmented into domains to which only specific file types would get access. Secure Computing intends to make its Linux secure kernel available commercially, as well.

**Motive Communications**, a maker of software for automating customer support via the 'Net, last week announced it has acquired fellow Austin, Texas, firm **Ventix**, which offers software for answering end users' questions about complex applications and business processes. Motive's focus has been mainly on automating support for simpler desktop-related issues. Financial terms of the transaction were not disclosed.

## Concord's Blaeser is thinking bigger

Net management firm's CEO looking to expand professional services group, make more acquisitions.



*Five years ago, Concord Communications saw a niche in network performance reporting, something big net management platform vendors such as Hewlett-Packard and IBM had missed. Concord exploited that niche with its Network Health software and has since become a \$40 million company that is king of the hill in that market. Now Concord CEO Jack Blaeser is setting his sights on \$500 million in revenue. Network World Senior Editor Jeff Caruso recently caught up with Blaeser to find out more.*

**You say you'd like to increase Concord's revenue to \$500 million in three years. How do you plan to do that?**

Our basic strategy is to focus on optimizing the experience that the customers of our customers have when they either click on the URL or hit their Enter key.

We have very good technology that scales and is flexible. But to grow the company to the size I'm trying to, we have to move into applications, services and systems. Empire, our first acquisition, moved us from networks into applications and systems.

You'll also see us expand our professional services organization because as our solutions get bigger and more complex our customers will need more handholding to make sure it's done properly. We'll expand our technology base through acquisitions. We hope to make two or three acquisitions this year.

**How is the merger with Empire Technologies going?**

We're in the process of hiring additional resources for Empire — such as sales and marketing folks, and development people — to broaden its product. Empire's technology is probably more elegant, but it's obviously not nearly as com-



prehensive as what BMC has.

**What kind of companies are you looking to acquire?**

The target would be a company that's slightly bigger than Empire — more than 10 people but probably less than 100. It would have to have a technology that somehow helps us

more effectively manage an e-business problem. That could be technology within the client, Web servers or database servers; a real-time capability that helps us more quickly isolate a problem; or a correlation technology so if you have a failure, it identifies which failure caused all the thousands of red icons to appear on your OpenView screen. It will probably be a company that has technology that's ready to go to market but doesn't have a distribution and sales channel to effectively do it.

**From a technology standpoint, what are the things that management companies like Concord have to do differently to help companies manage e-business environments?**

One is scale. When you're talking about e-business, you're talking about tens of thousands of things you've got to manage in large enterprises and service providers. We have development underway to help us manage millions of elements in a seamless solution.

You have to integrate information you see in the client with what you see in the network cloud, network infrastructure, services, systems and applications — and present it in a way that can quickly lead to action to fix problems.

You also have to make all your solutions have the lowest administrative footprint possible. Although the problem's getting bigger, the IT organizations of enterprises and service providers are not growing as much. The product has to be very easy to administer by a reasonable number of reasonably knowledgeable human beings.

**Concord is taking different capabilities and putting them all in one place. But isn't that what management platforms like OpenView and Tivoli already do?**

The platform people overcommitted. Years ago they said, 'Give me \$15 million or \$10 million, and I will solve all your

See **Blaeser**, page 50

## QUICKTAKE

## IntelliSeek's BullsEye 2

With a billion or so pages and hundreds of search engines to choose from, how does one find the right information on the Web?

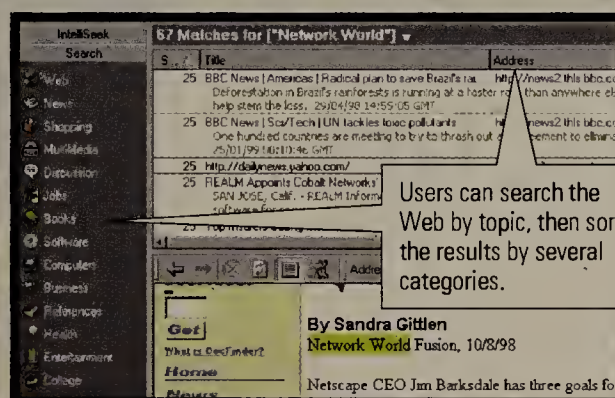
IntelliSeek hopes the answer will be by using the company's Windows-based BullsEye 2 application from your desktop. BullsEye 2 can search multiple engines simultaneously, with more than 700 different search sites built into its repository. In addition to being able to search the Web, the tool categorizes the different engines so users can tailor their search to specific areas, such as news or jobs.

Users can save queries for future use, as well as convert search results into reports that can be stored as a Web page or e-mailed to colleagues. BullsEye 2 uses the Internet Explorer browser engine to display specific search results, so users do not have to switch between applications. BullsEye 2 also works with the Internet Explorer tool bar.

Among Version 2's biggest improvements is the price: BullsEye 2 is now free. Available for Windows 95, 98 and NT, it can be downloaded from the company's Web site.

IntelliSeek is also developing a tool kit that will enable companies to use BullsEye 2 for searching intranet as well as Internet resources.

IntelliSeek: [www.intelliseek.com](http://www.intelliseek.com)



Users can search the Web by topic, then sort the results by several categories.

By Sandra Gittlen  
Network World Fusion, 10/8/98  
Netscape CEO Jim Barksdale has three goals for





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# Software maker 'rents' system management expertise

BY JOHN COX

BOULDER, COLO. — Corporate IT groups can now rent the systems management expertise they need from a new breed of third-party service company that uses networks as delivery routes.

Software vendor Rogue Wave, for example, pays a monthly fee for start-up StrataSource to monitor and manage the company's Boulder, Colo., data center from afar. Rogue Wave gets round-the-clock coverage without having to find, hire and train three shifts of data center staff. The company has been using this arrangement for about nine months.

Remote management is made possible through a set of small StrataSource programs, called agents, that are loaded onto each of Rogue Wave's three multi-processor Windows NT servers. The servers host business applications and a Microsoft SQL Server database. The agents schedule various management tasks, monitor an array of operating system and database event logs, and report

trend information and problems to StrataSource administrators 1,500 miles away via Internet-based e-mail.

Before turning to StrataSource, Rogue Wave's technical staff was plagued with late night and early morning alarms concerning its NT servers and SQL Server database, says Keith Spitz, director of IT.

"They watch our systems for us 24-7 and try to correct problems any time of the day or night," he says.

StrataSource experts did a thorough, highly detailed assessment of Rogue Wave's servers, database and applications. Then the staff recommended a passel of changes to the systems for improved performance and reliability.

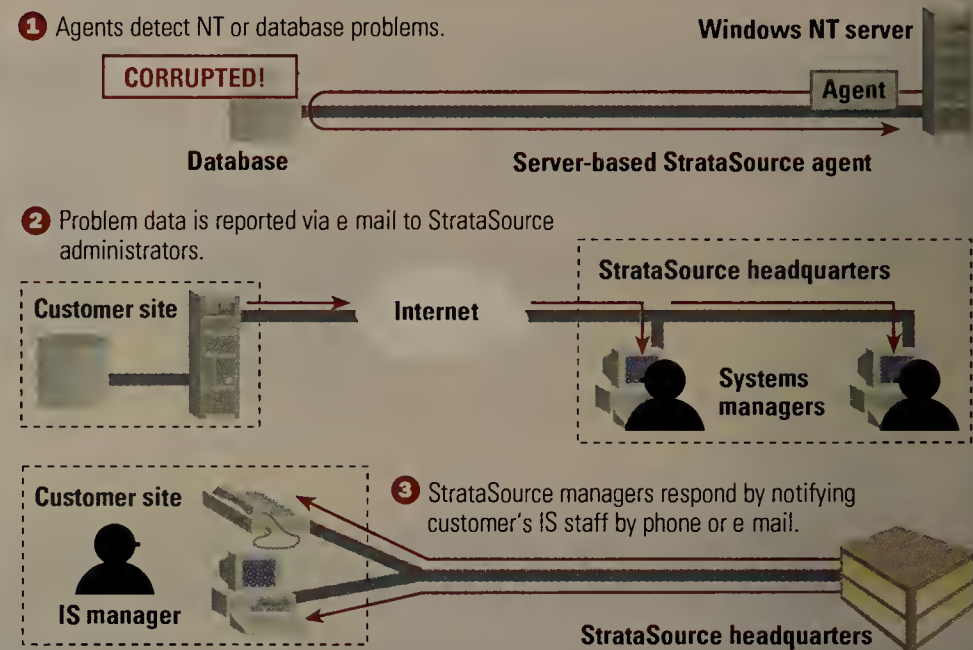
When the software agents alert StrataSource managers of a potential problem, the managers can log on to Rogue Wave's servers. In most cases, the managers can fix the problem or at least start fixing it. "There's a lot they can do as long as NT itself hasn't failed," Spitz says.

The StrataSource staff doesn't

See **Rogue Wave**, page 50

## Renting systems management

IS departments can now use third-party experts, such as StrataSource, as round-the-clock systems managers.



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# Mercury rises to Web site testing challenge

BY CAROLYN DUFFY MARSAN

SUNNYVALE, CALIF. — Need your Web site stress-tested by the end of the

week? Mercury Interactive now offers an outsourced service that guarantees 24-hour turnaround on load balancing, capacity and other performance tests

conducted over the Internet.

Mercury Interactive is a leading provider of Web site testing tools, with its flagship LoadRunner software. Last

week, the company announced a service based on LoadRunner called ActiveTest, which generates traffic, measures response times and identifies bottlenecks. With ActiveTest, Mercury Interactive's staff creates LoadRunner test scripts, manages the testing process and provides recommendations for enhancing performance. Customers of ActiveTest include athletesfoot.com, WebMD and Travelocity.

Mercury Interactive officials say they are the first to offer a hosted Web site testing service. The company has a server farm that emulates thousands of users hitting a Web site at the same time. If the site performs slowly, the service can pinpoint whether the problem lies in network bandwidth, server capacity or some other area, says Zohar Gilad, vice president of product marketing.

"We can create Web traffic equivalent to more than 100,000 plus users and Web server load of 3 billion hits per day," Gilad says. "We have the capacity to test any Web site."

ActiveTest is ideal for start-up ventures that don't have the money for testing staff and equipment, says Deanna Falcon, director of customer care and quality assurance for bitlocker.com. Launched in beta mode a few weeks ago, bitlocker.com is a free service that lets consumers build and maintain databases over the Web. Bitlocker.com provides templates for creating the database as well as the database management system software, backups and other maintenance services.

"ActiveTest was a real lifesaver for us," Falcon says, explaining that Mercury identified bandwidth and system configuration problems that bitlocker.com's developers had not discovered. "It saved us and our customers from having not such a good initial user experience," Falcon adds.

ActiveTest starts at \$15,000. Once a company purchases ActiveTest, they can have the test scripts to run themselves on LoadRunner or Topaz, Mercury Interactive's Web site monitoring software package. Mercury Interactive also offers a Web site monitoring service based on Topaz called ActiveWatch.

Mercury Interactive: [www.merc-int.com](http://www.merc-int.com)

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Canobeam III also features a one-piece design, where the controller is built into the head unit, as well as SNMP (optional). For more detailed monitoring of the DT-50, the unit features a Remote Monitoring Function in which an RS-232C cable is connected between the unit and a PC.

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# Canon



# Monitoring tool takes control of Exchange networks

BY JOHN FONTANA

HOUSTON — BindView next month will release a product

designed to give e-mail administrators better control over Microsoft Exchange systems that are handling growing numbers of users

and messages.

The company says its bvControl for Microsoft Exchange will enable administrators to analyze configuration,

security and performance data to weed out potential problems and forecast future needs.

The software has query-based tools and a monitoring engine. The query tools let administrators check the configuration of servers, mailboxes and user attributes, find corrupt attachments and check access rights to public folders.

For example, a query can be run to determine which servers have outdated versions of Service Packs. E-mail administrators also can find their most active users, and scan the contents of mailboxes and public folders for keywords that may violate messaging policies.

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The monitoring engine keeps track of performance counters and event logs, and can send alerts. An auto-correction feature can restart failed services, such as the Message Transfer Agent.

## Putting bvControl to use

“We are using this as a planning tool,” says Jim Schultejans, unit manager for Commerce Bancshares in Kansas City, Mo.

Schultejans used bvControl to discover that one of his three Exchange servers, which supports 4,500 users, had up to 3G bytes of space taken up by stored attachments. The company is now considering a policy to have users employ FTP to send large attachments. He is also monitoring the roll-out of Exchange public folders.

“We will track usage and try to determine if we need to add another server just for public folders,” he says.

BindView's bvControl polls machines from a central location so software does not need to be installed on each server. Users can set up any number of bvControl stations to monitor blocks of Exchange servers and connect them to a central console that plugs into Microsoft's Management Console. This feature eliminates a step that is required with the management tools Microsoft provides. Those tools require data to be exported to a spreadsheet for analysis.

The BindView software ships with about 50 Knowledge Scripts that can check services such as mail queues to see if they are near capacity.

The software, expected to ship in the middle of next month, will be priced at \$1,500 per server and \$12.95 per mailbox. The console license will cost \$4,000.

BindView: [www.bindview.com](http://www.bindview.com)





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Whether you're taking those first tentative steps toward migration, or think you can manage with both feet, go with the one company that's done a lot more than just get it's toes wet: **Mission Critical Software**. Unlike other systems management environments that have been designed for Unix- and mainframe-based solutions, our OnePoint solution was designed specifically to work with Windows NT. In fact, over 50% of the Fortune 100 companies have turned to us for managing their Windows NT environments. And now, having this incredible background with Windows NT, we're uniquely positioned to help you easily migrate to and manage your new Windows 2000 environment.

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SYSTEMS MANAGEMENT FOR WINDOWS 2000



**Rogue Wave,**  
continued from page 44

simply sit around waiting to be alerted.

"They do proactive monitoring, nightly systems logs, database consistency checks, disk free-space management

and so on," Spitz says. "They call us with this information or alert us that we have to increase the size of the database."

The decision to rely on an outsider to watch over critical systems was fairly easy for Rogue Wave. For one thing, managers were impressed by the skills and

expertise of the StrataSource staff, which currently includes 22 full-time technicians. StrataSource, based in Menlo Park, Calif., spun off last year from Relational Data Systems, a systems management consultancy in Irvine, Calif.

The economics of using a third party

also appealed to Rogue Wave. Although hard numbers are lacking, Spitz's team was able to identify some of the costs associated with every hour of downtime, such as loss of sales momentum and decreased customer service.

"It was mainly a preventative argument — they could prevent problems from ever happening in the first place," Spitz says.

StrataSource charges \$45,000 to \$65,000 yearly for its service, depending on the number of servers. According to StrataSource President and CEO Thomas Jones, customers get a return on their investment in about two months. That's because hiring round-the-clock staff for even a small data center will cost a customer about \$500,000 per year, he says.

Jones claims StrataSource is unique, but other vendors offer similar services. Resonate of Sunnyvale, Calif., offers an Internet management service that is designed to monitor a customer's entire infrastructure: network, servers and applications.

Currently, StrataSource doesn't focus on applications but on their associated databases. ■

**Blaeser,**  
continued from page 41

problems. They probably solved a reasonable number of problems, but they obviously didn't solve all the problems.

There are things that we're not going to do. We have no interest in software distribution, inventory and asset management, element management or help desk software. The platforms do all that stuff. We're going to focus on optimizing performance.

## How does Lucent's acquisition of INS affect Concord?

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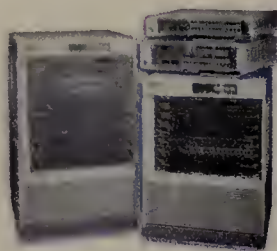
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M O T O R O L A   E M B E D D E D   S O L U T I O N S



'Net Insider . Scott Bradner

## TOO DUMB OR TOO SMART?

**A** week before Christmas, Toys 'R' Us announced that it was not going to be able to deliver all the toys that had been ordered over the Web in

time for Christmas morning. The TV news shows played the story for all it was worth — and more — giving Toys 'R' Us quite a black eye. But if I put on

my conspiracy theory hat, this sequence of events makes a lot of sense.

The way the story was painted, Toys 'R' Us was so dumb or had such a bad software system that the retailer kept accepting orders long after it should have been clear that the company was not going to be able to deliver what

had been ordered. This was the lead story on most of the local and national news shows and a front-page story in many newspapers on the day of the announcement. It also popped up from time to time over the next few days. It would have been hard for anyone to avoid hearing about this failure of e-commerce. As penitence, Toys 'R' Us offered \$100 coupons, redeemable at its stores, to those who got caught up in the mess.

Toys 'R' Us was not alone in accepting orders in excess of the company's ability to deliver the goods. But it was the company that made the biggest splash when it had to admit its inability to produce. The image of Santa not showing up for some little kid is a strong one.

So let's look at this situation through Machiavellian-colored glasses. Toys 'R' Us has a lot of brick-and-mortar stores that pay rent and employ a lot of people. Sales over the 'Net can cannibalize sales in these physical stores. Toys 'R' Us may feel that it cannot ignore the

**■ What better way to slow down the explosive growth in 'Net sales than to make potential users of e-stores nervous that they will not get their goods?**

'Net, but the company must feel as though it is in quite a quandary: a sale over the 'Net may just cost the retailer more — when the whole corporation is considered — than Toys 'R' Us makes in profit off of the sale.

So what better way to slow down the explosive growth in 'Net sales than to make potential users of e-stores nervous that they will not get their goods? What better way to do that than to have a very high-profile failure of e-commerce? And, just to complete the conspiracy scenario, what better way to ensure that those nervous customers know the location of local Toys 'R' Us stores than to bribe them with a coupon that can only be redeemed in a physical store?

Maybe Toys 'R' Us is not smart enough to do this, but if I were the company, I'm not sure I'd want to admit that to myself.

Disclaimer: I do not know that the Harvard Business School teaches Machiavellian principles, so the above scenario is my own.

*Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.*

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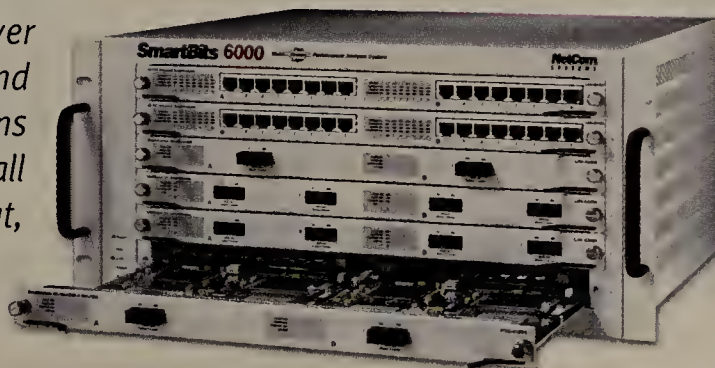
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# The ASP effect on the software industry

BY JOHN COX

**T**he Internet model of servers accessed by simple browsers is turning the business software industry inside out.

Existing application vendors are working out new business and licensing practices so they can offer their software as 'Net-based services, for which customers pay a monthly fee instead of a more or less one-time licensing fee.

At the same time, start-ups are introducing applications designed from the ground up as hosted application services and pricing them accordingly. Some of these firms are emerging as rivals to traditional financial or accounting software vendors. But others are minting their software, such as collaboration and electronic marketplace tools, especially for the Internet.

The reason that both old and new vendors are targeting this market is clear: An increasingly big chunk of application sales is expected to come from hosted services in years to come. Forrester Research, for instance, says that about one-fifth of total applications revenue will come from hosted services by 2003.

Established software vendors are attempting to play in the hosted applications market in a variety of ways.

## HOSTED APPLICATION SERVICES

*Established vendors and start-ups vie for a share of a growing market.*

interactions: marketing, sales and support.

J.D. Edwards launched its application service, dubbed Jde.source, earlier this month. The company pays MCI WorldCom's UUNET subsidiary to run and maintain a pack of Sun Solaris servers and to maintain the network. But J.D. Edwards handles all the support of its OneWorld software suites and sells the service to customers through its own sales force. Today, users can access OneWorld through a downloaded software program, while a complete Web version is scheduled for release around midyear.

Not only will the established vendors face off against one another as ASPs, but they will also need to

they don't know the Internet," he says.

The traditional software players see it differently.

"Customers have a business problem, and it takes intellectual property to solve it," says Jim Whorley, general manager of global outsourcing for Baan, which has U.S. headquarters in Herndon, Va. "Start-ups cannot come up with the kind of intellectual property that Baan, SAP or other vendors have created over years. It's naive to suggest otherwise."

In one sense, both companies are right. The vendors' intellectual property, manifested in the code of applications such as SAP's R/3, is a formidable asset. But the Internet changes the way in which those assets have to be deployed, in that companies are able to integrate their business processes with those of business partners more so than ever before.

Forrester Research analysts predict traditional business applications, such as enterprise resource planning programs, will not even be the main drivers for hosted services. Rather, applications written from the ground up for e-business transactions are expected to become the leading hosted programs.

One challenge for the established vendors is that their applications were designed to be used by individual companies, not shared among many. That adds to the work that needs to be done to roll out an application service to each new customer. "Companies like SAP and PeopleSoft will find it hard to make the systems and organizational changes needed to make true network-based applications," says Laurie Orlov, a research director at Forrester.

Pricing is also an issue. Oracle and J.D. Edwards have constructed their services so there's no adverse revenue effect on their sales staffs. In Oracle's case, customers decide to buy the Oracle Applications suite, then decide whether to use — and pay extra for — a hosted service.

Forrester's Orlov argues this is "old world" pricing — customers rent for the same cost as buying, and have nothing at the end of the rental period. What's needed, and Forrester analysts predict will arrive in the next year, is "subscription-based" pricing, which works more like a lease. For a given period, business customers will pay a per-user monthly fee that includes license, implementation and service. At the end of the term, they can buy or renew their lease.

Going forward, businesses moving into e-commerce will make more as well as more urgent demands on software vendors and service providers that will force further changes by the software vendors and ASPs.

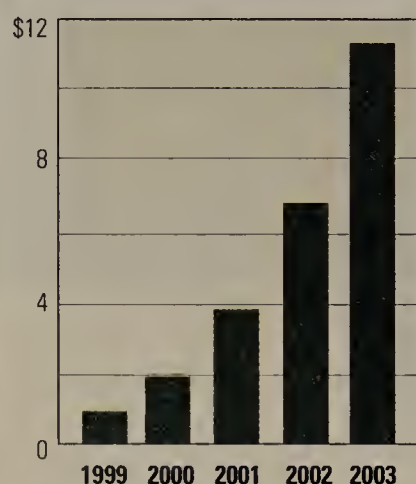
Some customers will look for new Web-based applications that will let companies collaborate more easily. Others will demand groups of integrated applications from different vendors. Others will want hosted services such as electronic marketplaces that enable companies to manage procurement or other processes.

Established and new software vendors, on their own or with service providers, will have to show they have the in-house expertise and the business partnerships to meet these demands. ■

## Developers ride the outsourcing wave

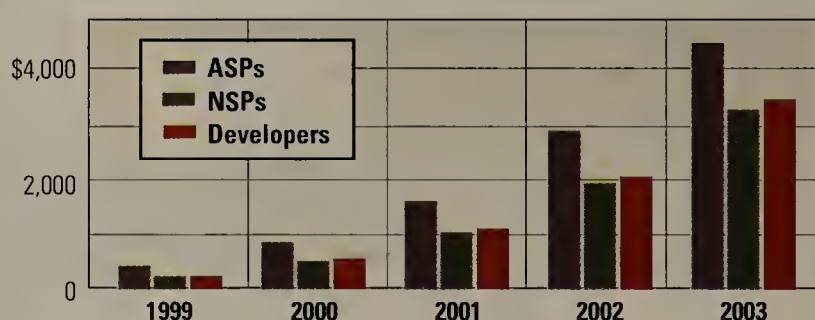
**While ASPs stand to gain the most from the expected boom in application outsourcing, software developers will also have a large piece of the market.**

Total outsourcing revenue (in billions):



SOURCE: FORRESTER RESEARCH, CAMBRIDGE, MASS.

Outsourcing revenue breakdown (in billions):



**ASPs** are application service providers — companies that buy applications and offer them, with an array of services, as a network-accessible service for a monthly fee.

**NSPs** are network service providers — companies that own and run the data centers and networks used to host and access the applications.

**Developers** are independent software vendors — companies that write the applications.

Some, such as Lawson Software of St. Paul, Minn., are refocusing sales to ASPs themselves, which in turn will market the software to businesses targeted by geography, industry or size. Baan is taking a similar approach, but the company only sells its software to ASPs that are trained to Baan's "Level 1" support criteria.

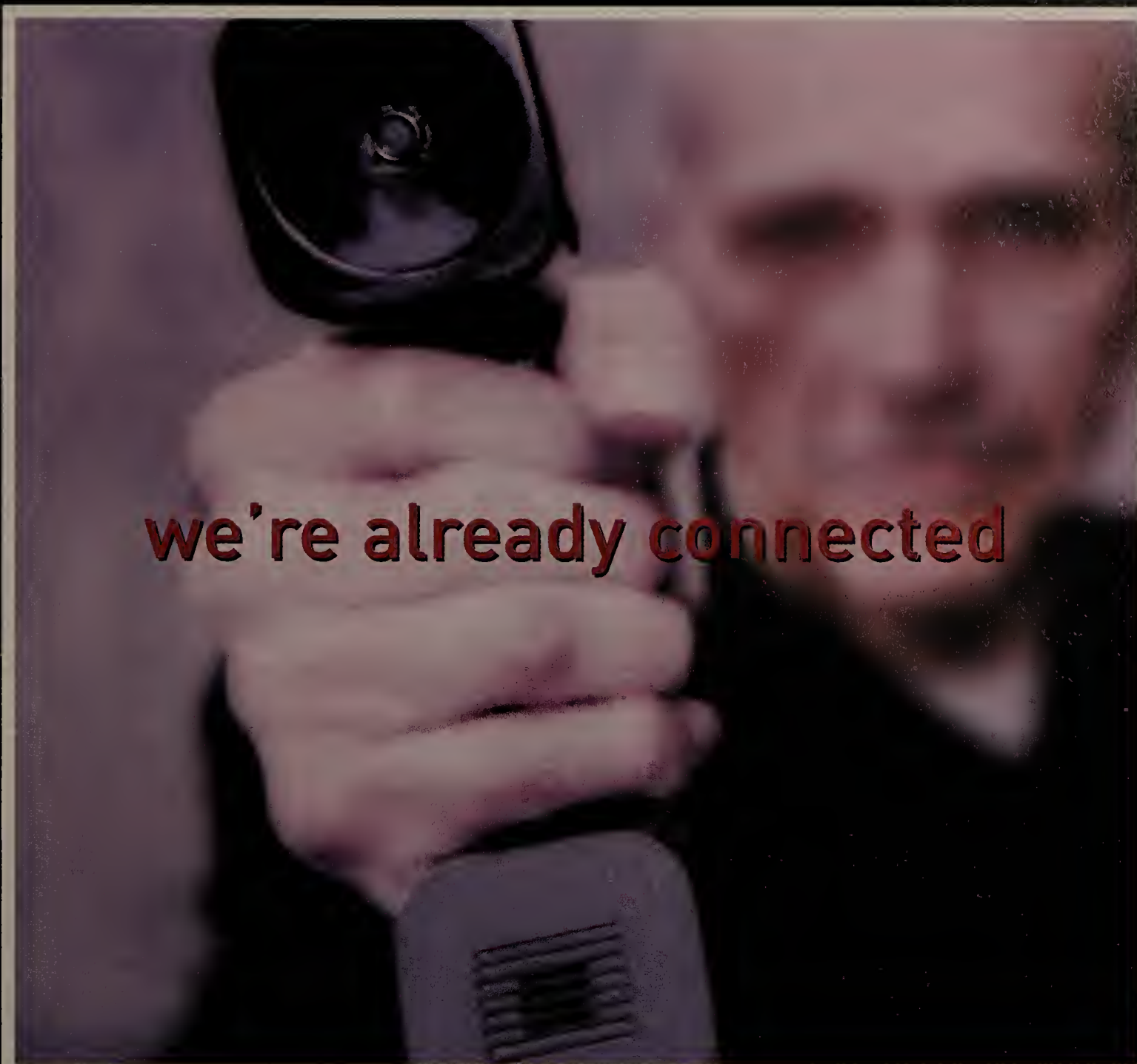
Other software makers, such as J.D. Edwards and Oracle, are becoming ASPs. Both companies contract with service providers to host servers that run their software. But both software firms handle all customer

stave off start-ups building applications designed from the start to run in a hosted environment.

One such newcomer is Intact, a Cupertino, Calif., firm that will launch a hosted business accounting application. Intact will rely on service provider Verio for its data center needs. Intact founder David Thomas, who launched a timesharing accounting software company in the 1970s, says established vendors are just as new to the ASP market as last week's start-up.

"They start at the same place as everyone else. And





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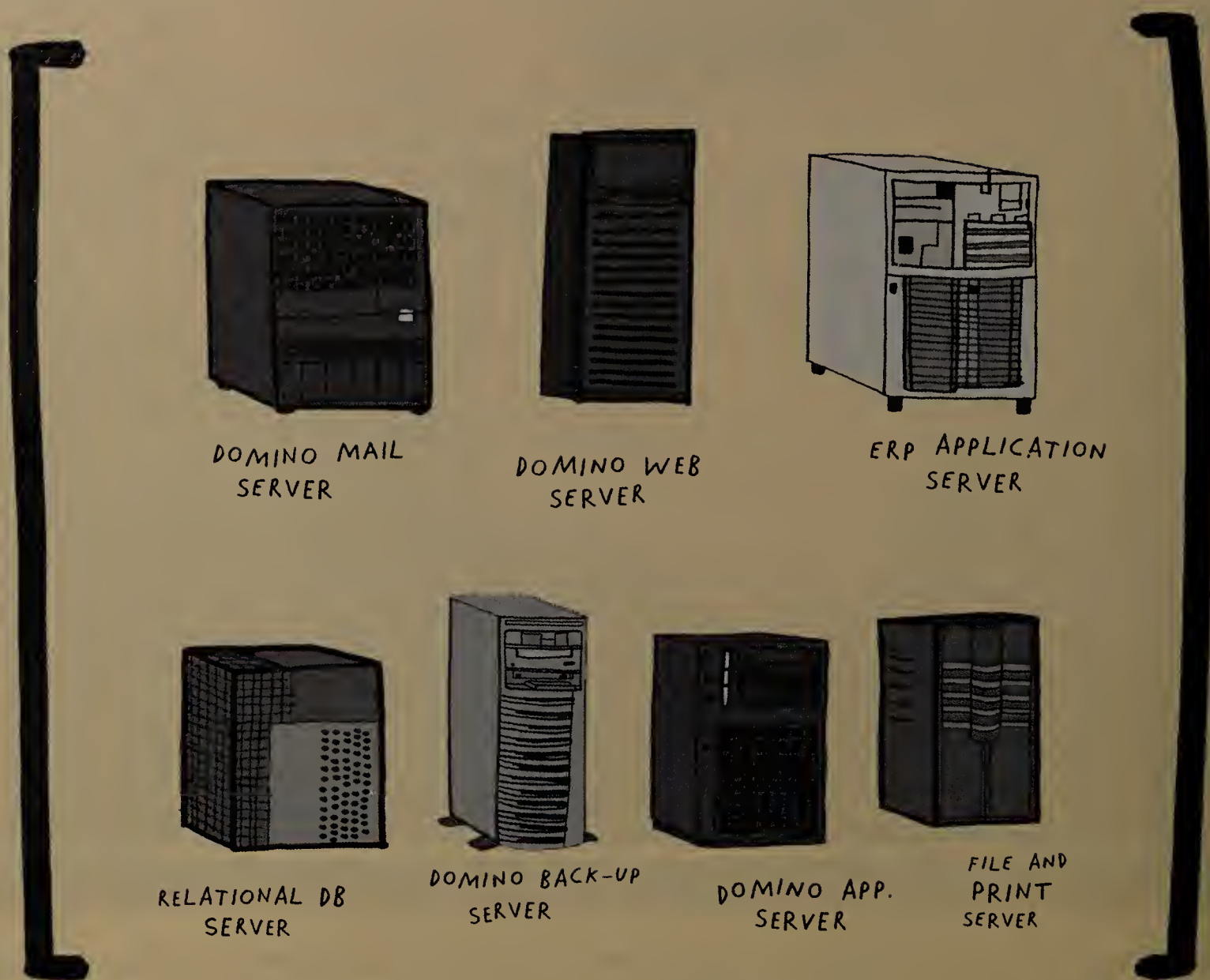
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# Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

## Ask Dr. Intranet

By Steve Blass

Management has told us to turn our main intranet Web server into an enterprise information portal this year. I've heard the term

"portal" used to describe Internet sites such as Yahoo, but I'm not sure what a portal is besides a glorified home page with a search engine. What are enterprise information portals, and where can we find information about portal products?

Enterprise information portals have various definitions. The common thread is that a portal provides a centralized browser-based access point for structured and unstructured information sources, ranging from Internet pages to corporate mainframe data.

A good definition of portals can be found at [www.dkms.com/EIPDEF.html](http://www.dkms.com/EIPDEF.html), which compares definitions from firms such as International Data Corp. and Merrill Lynch. Common elements in portals include the ability for users to personalize the interface, and the inclusion of tools to connect to enterprise data sources such as SQL databases and Web-based information sources. Many vendors offer portal products. All offer personalization and collaboration features combined with different levels of push and pull technologies for interactive enterprise knowledge sharing through a Web browser. Most provide tools for building decision-processing support capabilities.

The trick is to make the vendors understand what enterprise information portal means to your company.

Steve Blass is a network architect at Sprint Paranet in Houston. You can reach him at [dr.intranet@paranet.com](mailto:dr.intranet@paranet.com).

## Layer 7 awareness advances QoS

BY DAN MATTE

Today, there are sophisticated tools that let you take advantage of Layer 7 information returned by applications to end users, especially in the high-availability, load-balancing realm. These tools let you easily verify that the site content is responsive and correct, or test your site from a customer's point of view to ensure the correct applications and content are present.

a higher priority on the person who wants the catalog item. Devices that end at Layer 4 treat both types of data the same, opening the possibility of sending the streaming media traffic to a server that is incapable of providing a response, resulting in error messages and delays.

Yet the new Layer 7 intelligence gives you additional control — total traffic and content control. By giving you the freedom to fully open the application/pre-

Common Open Policy Service or other quality-of-service protocols, the Layer-7-aware device can sift through the traffic and assign priorities itself. This frees you from having to rely on the application or the network gear for these purposes.

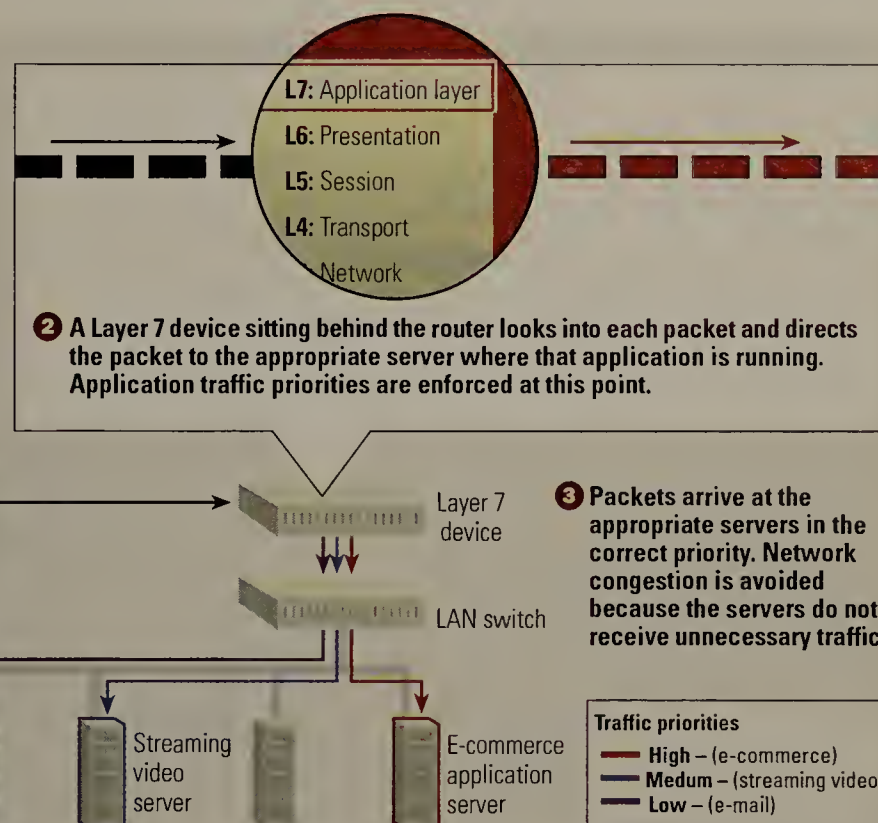
Are there any set standards for this type of Layer 7 functionality? The short answer is no. Layer-7-aware functionality is more complementary — it lives in harmony with networks that offer things such as Diff-Serv. It takes generic traffic

### HOW IT WORKS

#### Using Layer 7 for load balancing

Next-generation network devices can look deep into packet levels to improve data delivery and traffic prioritization. Such devices allow load-balancing decisions based not only on URLs, but also on actual application types, no matter what port number they are using.

1 Traffic from the Internet enters a router, which sees each packet's IP address, but is blind to what application the packet is meant for.



But while it's possible to verify that the right content is being sent, it's also becoming possible to open the packets of data coming across the wire (regardless of IP address or port) and make load-balancing decisions based on that information.

Essentially, this migration of intelligence moves beyond Layer 4 functionality. For example, take Port 80. There are many types of traffic that flow over this port in addition to the normal types of Web traffic. The problem? Devices whose capabilities end at Layer 4 are blind to the various types of traffic flowing through the pipe, so they treat all traffic the same.

But all traffic isn't the same. For a load-balancing product, it would be quite useful to know whether the data flowing through the port is streaming media or simply a request for an item out of your catalog. Perhaps you would like to place

sentation layer of traffic and closely examine what's inside, you can make more intelligent load-balancing decisions based on types of applications — not just on IP and port number.

This allows you to make complete load-balancing decisions based not only on URLs, but also on actual application types regardless of the port number they happen to be using. That would allow you to recognize, for example, a video conferencing stream, and make appropriate load-balancing decisions based on that information, even though the application may be using a dynamically assigned port.

Part of the functionality of this type of Layer-7-aware product is to guarantee that different types of traffic can be assigned different priority levels. Instead of relying on routing equipment or applications to identify traffic through Differentiated Services (Diff-Serv),

and says, "This traffic requires this type of service bit to be set because it's voice-over IP, yet this other type of traffic needs a low-priority type of service bit."

The big news, however, is the final benefit that these types of devices present. In the past, there was always a trade-off between intelligence and speed. With Layer-7-aware technology, you'll be able to make more intelligent traffic decisions at wire speed. You'll be free to make informed decisions on various types of traffic and its destination, optimizing your Web access and providing a better end-user Web experience.

The bottom line is efficient traffic prioritization and intelligent load balancing.

Matte is director of product management at F5 Networks, a maker of Internet traffic-management and content-management products in Seattle. He can be reached at [d.matte@f5.com](mailto:d.matte@f5.com).



Gearhead — inside the network machine . Mark Gibbs

## A BETTER PLATFORM ON YOUR PALM

Last autumn, Gearhead wrote enthusiastically about the wireless Palm VII (NW, Sept. 6, 1999, page 42). I still like the Palm, but fickle geek that Gearhead is, a better device has been found, and the Palm has been cast aside.

Now before we discuss this digital delight, let us take a moment to discuss what we now think of the Palm. First, the Palm's display technology: While better than its forebears, the Palm only has a monochromatic display. The greenish glow of the back-lighting is OK, but use it in a dim room and the reflected light makes you look like an extra from "Night of the Living Dead."

Second, there's the issue of the Palm's operating system, PalmOS. Gearhead will probably be taken to task over this and certainly the outraged cries of "Sacrilege!" and "Off with his trousers!" will be heard from a few readers, but let's be honest — PalmOS isn't that great. The integration between applications is OK but nothing to get excited about, and the range of services and operating system features is limited. Gearhead will be pleased to rekindle



this criticism if you can show us a Palm playing a movie.

Yeah, yeah, we know PalmOS was designed for a very "skinny" platform, but when it comes down to it Gearhead and, we suspect, every true geek, wants a gigahertz processor with at least a gig of RAM in a size that can fit in a pocket protector. There's no such thing as too much power.

Anyway, what is the device that has captured the attention of Gearhead? It is the Casio Cassiopeia 105.

We have been toting this little gem around for the past few weeks, and it is much easier to use than the Palm, more flexible, has more applications, has a better featured operating system, a color display, better sound and, yes, can even play videos.

The Cassiopeia runs Microsoft Windows CE on a 13 MHz Strong-Arm processor, comes with 32M bytes of RAM, an infrared port, a stereo audio jack, a microphone, a serial port, a CompactFlash port and a 65,536 color, 240 by 320 pixel back-lit display.

The Cassiopeia also comes with a number of bundled applications and utilities, including Microsoft's ActiveSync 3.0 software that provides excellent integration with Outlook and other Windows applications, a Palm conversion data utility and multimedia tools.

Curiously, over the past few weeks the amount of commentary about the palmtop market has increased significantly, and a number of articles in the more consumer-oriented press have tolled the death knell of Windows CE with headlines that make it sound as if the Windows CE development team should simply shoot themselves and get it over with.

Now we hope that this column's faithful readers will have noticed that Gearhead is not that enamored with Microsoft operating systems. Indeed, the disdain that Gearhead has for the

stability — or rather lack thereof — of Windows in all its wretched forms, is closer to disgust and loathing than simple criticism.

That said, Windows CE is, Gearhead thinks, one of the better choices for handhelds and palmtops. Of course, if we had our druthers, we'd much rather have a real operating system such as BeOS on the Cassiopeia but, alas, Casio forgot to include us in the development team. Darn.

Anyway, the Cassiopeia is a great tool. Weighing in at 9 ounces, it is highly portable, has a good pen interface, reasonable battery life and a speaker you can actually hear (it has become Gearhead's alarm clock much to the irritation of Mrs. Gearhead, who was roused yesterday by the loud caroling of a sound sample of the bells of Big Ben being played by a really neat alarm program for Windows CE called AlarMe).

This is definitely a cool tool, and once Gearhead gets a wireless connection for it, our happiness will be complete.

*Verbal sparring to gearhead @gibbs.com.*

## NetworkWorld Fusion Spotlight

News, tips and tools from our Web site

### Fusion redesign

Log on to Fusion this week and you'll notice a new look — we've redesigned the entire site to make it easier to find information and breaking news. The home page, for example, now has a series of sections that let you quickly scan the latest breaking news, reviews, columns and newsletters from *Network World* and *Network World Fusion*.

We think it looks pretty snazzy. But beyond new

graphics, we're investing heavily in staff and technology to make Fusion an even more useful resource.

Take, for example, our revamped Research area. It will be a place to learn about new technologies, get background information on companies and find out what's on tap for the future of networking.

With primers, buyer's guides, reviews, stock quotes and white papers, as well as access to our more than five years of archived articles,

you'll be able to make purchasing decisions based on the information you'll find there. In the Research area you'll also see technology-specific search engines that help you get what you need quickly. Most search engines are bogged down by query results that are unrelated to your search. But *Network World's* new search engines only comb Web sites that are directly connected to the technology.

Coming soon will be a major upgrade to our workflow system. Our new database-driven system will eventually let us offer a host of new services, including customized Web pages and e-mail alerts. So head online, and let us know what you think.

### Help Desk

A reader is having difficulty with a network interface card on a Windows NT Workstation. The card is not releasing his IP address. He

can input a static IP address, but if he removes it, the address reverts to the one it was stuck on. Help Desk Editor Ron Nutter recommends assigning the problem address to a nonexistent workstation. However, if that doesn't solve the problem, Nutter says it could be trouble in the NT Workstation registry. What do you think?

*DocFinder: 6528*

### NOS resources

Want to know everything there is to know about the major network operating systems (NOS)? Check out our NOS Research area. We've got articles, white papers and information from each of the top NOS vendors. We've also got links to user groups for you to join and newsgroups that will keep you up to date on the latest products and trends. And make sure to test-drive our new NOS search engine, which only searches sites

specifically related to NOSes.  
*DocFinder: 6529*

### The great Linux debate

Next week is our Linux Showdown at LinuxWorld Expo in New York. We've got the top Linux vendors in one room to debate the future of Linux. What makes each vendor's take on the popular operating system special? We'll find out. Log on to our forum and let us know what your questions are — we'll add them to our Showdown list.

*DocFinder: 6442*

### Help Desk

Ron Nutter is standing by to answer your networking questions. Read his column every week on Fusion. *DocFinder: 2450*

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## Editorial

### A free opportunity

**G**iving away Internet access is all the rage. Everyone from AltaVista to NetZero to Kmart has jumped into the game. There are even reports that free DSL is just around the corner. Where is this going, and what does it mean to you? Maybe more than you think.

You probably aren't going to use one of these free services for teleworkers. It would be too much to ask employees to tolerate the ads that drive these sites (although some firms post outside ads on their intranets, so never say never), and the service accountability is questionable (I can hear it now: "I tried to send in the third-quarter forecast, but the link was down and I couldn't reach anyone at Kmart").

But there are reams of employees in your company who might benefit from having access from home. A plugged-in work force A) might get some work done from home (if nothing more than checking e-mail) and B) becomes more familiar with the Internet and might recognize an opportunity for the company.

Why not review a few of these free services and release a note recommending one? Explain how it works, how the provider makes its money and lay out the potential downsides — how users will have to tolerate a lot of promotion from the provider and local access is limited, so some user's phone bills will be hefty.

There is, however, a potentially bigger opportunity: Maybe your company should consider giving away Internet access.

Most of the companies that have played this hand are connected to the industry in some fashion or another — the computer makers, the big Web organizations and others. But what does Kmart know that your company doesn't?

Maybe Kmart knows that wholesaling 'Net access for something like \$12 per month (educated guess) is chump change compared to the opportunity to keep the Kmart brand in front of a nice demographic group. Think about it: For \$12 per month, Kmart will get a wealthy group of people who willingly dial in every couple of days for a few minutes of quality face time. Seems pretty cheap.

International Data Group analyst Frank Gens says free Internet access will explode this year as companies do the math. He writes: "In 2000, free Internet access deals will expand to all major e-merchant segments — brokers, banks, retailers, travel companies, etc."

Why stop there? Couldn't Toyota benefit from this? Citicorp?

This may be a great cause for you to champion in the hallowed halls.

— John Dix  
jdix@mcw.com



## Message Queue

### WOMEN IN IT

Regarding D. Corum's letter to the editor on her experiences as a woman in IT (Dec. 13, 1999, page 54):

I am a Certified Novell Engineer in my late thirties with a bachelor's degree in Computer Information Systems. I have been an engineer for seven years and I have been in IT for 17 years. I am leaving an industry that I have had all my education, training and experience in to run a business that is more "suited" to women. I finally had to make a choice because the stress and frustration I brought home was taking its toll on my family.

I was raised with the belief that women had equal opportunities in these times. It wasn't until I had reached a level that was normally associated only with men that I felt the sting of discrimination that I thought had been wiped out decades before.

I am excluded from the "good ol' boys" club that welcomes less-experienced, less-educated, less-trained and oftentimes, just plain incompetent members because, well, they are male. They team up and work in packs. I have seen two, three and four run together connected at the hip to do a job that I could do alone.

Women get 50% less credit than they deserve, and men get 50% more. I am sure there are other industries that went through these growing pains with women, but it amazes me that in this day and age we still don't have equal pay for equal work.

C. Trudeau  
Phoenix

### CUSTOMER SERVICE IS KEY

I enjoyed reading Linda Musthaler's column, "In e-comm, customer service should be fundamental" (Jan. 10, page 39). I have had to stress to a number of people the importance of customer service in Internet commerce, particularly with the security-phobia many online shoppers have. I once had a product show up a year after I had placed my online order. During that entire time I never once received a return call or e-mail or an apology.

Send letters to [nnews@nw.com](mailto:nnews@nw.com) or John Dix, editor in chief, Network World, 118 Worcester Road, Southborough, MA 01772. Please include phone number and address for verification.

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## MORE ONLINE

Find out what readers are saying about these and other topics.

**DocFinder**  
6521  
find it online

Thanks for bringing the issue to everyone's attention.

Saird Ellen Cabir  
Business development manager  
Visual Technologies  
Hartford, Conn.

### TOY STORY

I'm sorry to find that you covered only the less-interesting half of the toys vs. ctoy issue ("eToys attacks show need for strong Web defenses," Dec. 20, 1999, page 1). What you left out was any hint of information about the conflict itself.

I was left wondering how did a company (etoys.com) with an NSI domain name registry date of 1997 claim to be infringed by a non-competing site with an NSI registry date of 1995 (etoy.com)?

What is the nature of the conflict that spawned all this disquiet? Is it a case of big guys squashing little guys with a name they either want or want out of circulation? Or was there more to it?

I guess I'll never know because your reporting focused on the battlefield, not the issues. This piece was like analyzing the war in Iraq on the basis of the weapons used but skipping the pesky details of why the war started.

Don Person  
Albany, N.Y.

### THE PAIN OF ATM

I absolutely agree with Dave Passmore and Irwin Lazar's article "Pulling the plug on ATM" (Nov. 29, 1999, page 61). ATM has been a major pain from the very beginning of my company's implementation and continues to cause more problems than it's worth. It is difficult to configure, impossible to troubleshoot, and the worst part is running ATM on Bay Networks equipment — but that's another story.

One could argue that Private Network-to-Network Interface makes ATM easier to configure, but the argument doesn't hold up because it's still a pain compared to Ethernet.

Vaclav Vyvoda  
Sacramento, Calif.





The PITA Principal . Craig Johnson

## LESSONS LEARNED FROM A YEAR WITH DSL

For more than a year now, I have been one of the lucky few to have digital subscriber line (DSL) service to the office. Overall, my experience has been positive. However, I've learned a few lessons that may benefit other users out there and may also help you understand some of the issues you may face in the battle for the last mile.

First and foremost, I have found that DSL providers are selling services faster than their infrastructures can handle. In the race to sign up customers in mass numbers, customer support, network facilities, trouble ticketing, escalation procedures and other back office systems are lagging way behind.

One of the main challenges I have had with my DSL provider is that it does not have a real escalation and coordination system in place, relying instead on e-mail. There was one incident where I actually identified the exact interface IP address in the DSL provider network that was experiencing trouble; it took me over 30 hours of my own time to get all of the provider's operational arms to finally fix the problem.

My DSL provider "owns" the last-mile copper (and the phone system), the ISP network into which the DSL service interfaces and the DSL facilities themselves. These three parts typically make up a DSL service. In many cases, different players may own these parts. If a DSL provider that owns all the parts of the service can't seem to get escalation procedures in place, how can DSL service providers that rely on outsourced parts of an incumbent local exchange carrier's network offer high-quality services?

An oversubscribed infrastructure inevitably leads to a slowdown in DSL service, which I have experienced over the past few months. Using some very basic tools, I found the performance slowdown is not in the last mile, but between the DSL Access Multiplexer (DSLAM) part of the service and the ISP part — exactly where you would expect to find it if the provider were playing the oversubscription game. As the sales side of the



equation continues to fill the DSLAM ports, the network infrastructure that sits behind the ports can't keep up.

In addition, few providers actually offer a real guarantee for their services, such as a committed information rate (CIR) or minimum time to repair. Most just offer a "best effort" approach to their service. I even asked my provider if I could purchase a CIR service for an additional charge — the answer was "No."

Don't get me wrong — on balance I am happy with my DSL service. But if I were a small or mid-size business investigating DSL or a large company looking to set up DSL services for its branches, telecommuters and partners, I would make sure a provider could address the issues raised here before I bet the farm on DSL.

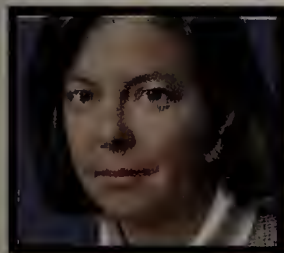
*Johnson is principal of The Pita Group, a consultancy in Portland, Ore. He can be reached at (503) 287-7542 or craig.johnson@worldnet.att.net.*

The Intelligent Network . Mary Petrosky

## WANT AN INTERNET-BASED EXISTENCE? GET A LIFE!

As we step into the 21st century, I'm having a paroxysm of Luddite-ism. Maybe it's millennium fever that has me feeling so philosophical. Maybe it's the AOL/Time Warner mega-merger, which promises even further consolidation of our media outlets and "corporitization" of the Internet.

Or maybe it was the announcement that Cisco, Sun and GTE made recently at the Consumer Electronics Show about their Internet Home Platform. According to the press release, this platform is for "building high-speed home networks that support New World services." By bringing "always on" Internet access to our residences, these companies will



help us access new Internet activities throughout our homes, such as downloading recipes to our built-in ovens and monitoring our home security. Cisco also plans to work with Whirlpool to build Internet-ready home appliances, such as refrigerators and ovens, which will go into Internet homes that Cisco will work with home builders to construct.

Is this what we want from the Internet? Don't get me wrong, I take advantage of the wide range of information available over the Internet, from IETF documents to tips for getting my kids to do their homework. But I don't want an Internet-based existence. Call me Old World, but I like to adjust the thermostat myself and to feel the texture of a blanket before I buy it. I don't see a burning need for an Internet-connected home so that I can remotely control my VCR.

Perhaps what's really bugging me is that the current telecommunications gold rush is exacerbating what is already a huge income gap in this country and around the world. Stock mania, coupled with a still hot acquisitions and mergers scene, has turned many folks into instant millionaires. Lawyers and other professionals are leaving their traditional jobs in droves hoping to hit it big with stock from some Internet start-up. For those of us who live near Silicon Valley, all this instant paper wealth translates to a housing crunch where a two-bedroom starter home will set you back a half-million bucks.

According to the Economic Policy Institute, the wealthiest 10% of Americans enjoyed 86% of the stock market's gains in recent years. Thanks in part to a hot technology market, the U.S. has 66 billionaires; meanwhile, 31.5 million people are living below the poverty line. The idea of a networked home perpetually connected to the Internet seems absurd in light of the reality that half of the world's people are trying to scrape by on \$2 a day. Do any of us really need a refrigerator that can tell us when the milk runs out? Does anybody really believe Agilent Technologies is worth \$37 billion?

Clearly the Internet and related telecommunications developments are having a major impact on our economy and society, and will for the foreseeable future. Certainly there is some significant social good that can come from the technology, such as remote medicine and distance learning, but I shudder when I read the prognostications of folks such as Ray Kurzweil and Esther Dyson, who expect the Internet



to become the basis of everything. Visions of information junkies dance through my head; public service advertisements will run on TV urging Internet addicts to just unplug.

I hope we don't get to the point where each of us is wearing our own personal LAN with wireless Internet access. I don't want a computerized heart monitor in my jogging shorts. I don't want a Web interface on my watch telling me I have 10 unread e-mail messages. In fact, sometimes I don't even want to know what time it is.

Fortunately, I've been in the industry long enough to know that, even at Internet speeds, technology usually takes longer to develop and deploy than we think. Hopefully, this delay will give us time to figure out how to use this technology for social good, not just to feed consumerism — and time to educate ourselves and our children to turn off the computers, cell phones, personal assistants and who knows what else and just take a walk.

*Petrosky is an independent technology analyst based in San Mateo, Calif. She can be reached at mary@mpetrosky.com.*





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# SPENDING SURGE

**Our 1999 spending survey shows network budgets climbed 10% last year, while increases were even higher among the largest IT buyers.**

BY SUSAN ELLERIN

**C**ompanies aren't just talking about IT being absolutely central to their business; they're backing up that sentiment with money — and lots of it. Network spending jumped 10% last year, according to the results of the 1999 *Network World* Spending Survey. By comparison, network spending increased 7% in 1998.

We conducted the survey to learn how much you spent on LAN, WAN, Internet and intranet products and services last year. Moreover, we wanted to see which technologies garnered the largest investments. We compared actual 1999 spending with 1998 figures and decided not to ask about Year 2000 spending because those figures are only estimates at this point.

Working with market researcher STAT Resources of Boston, we e-mailed a random sample of *Network World* readers and invited them to participate in an online survey hosted on a private area of Network World Fusion. The results are based on 1,330 responses.

The survey found that 78% of respondents received bigger budgets last year. In fact, more than one-fourth were fortunate enough to boost their network expenditures more than 20% (see graphic, page 66).

One thing is clear: Company size has a big impact on spending. The companies that have the largest network budgets also reaped the highest percentage increases in their budgets — an average of almost 14% in 1999, up from 8.6% in 1998.

Smaller network budgets also grew in 1999. Respondents who spent less than \$100,000 on their networks said their budgets had risen 6% last year, up from a 1998

increase of 4.5%.

While most of you experienced an influx of funding, 12% of respondents had to run their networks with less money in 1999. For example, one manager from a large financial institution complained, "Our IS budget has been raped of funds this year."

However, some who saw their network budgets go down last year may not have suffered. As one reader noted in the survey, declining equipment costs let him provide greater performance for less money. This in turn bought him a lot of support from upper management.

Another respondent pointed out that well-established networks only require moderate upgrades rather than large capital investments. "Network upgrades are no longer a strategic item, but cyclic," according to an educator who supports a 3,000-user network.

Faring neither better nor worse were the 10% of respondents who received the same amount of money to work with in 1999 as they did the previous year.

## Budget breakdown

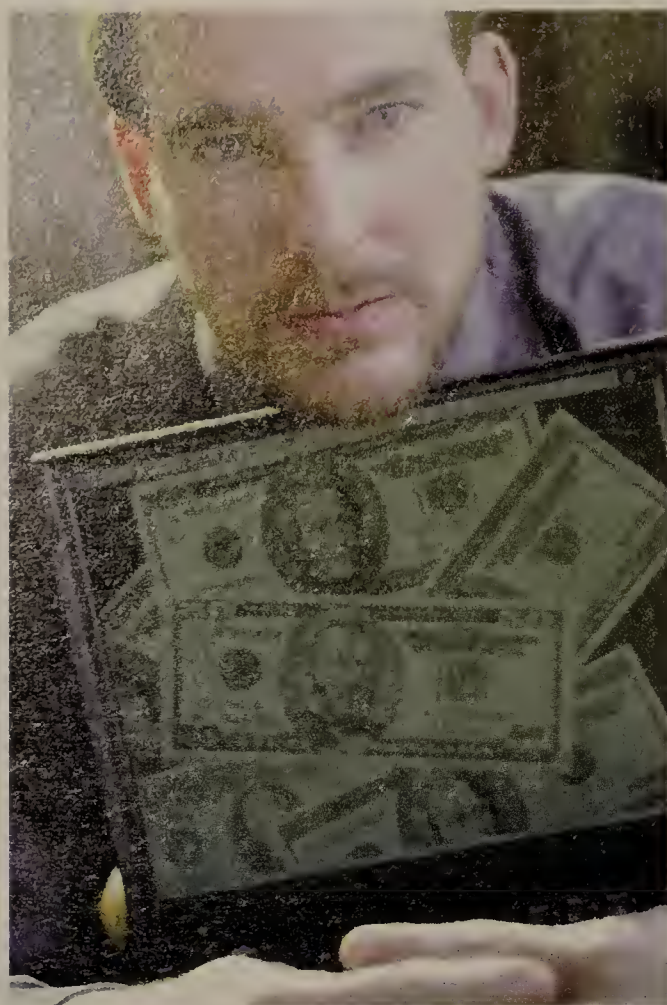
Respondents allocated just under half of their budgets to capital equipment, 37% to internal labor and the remaining 15% to outsourcing costs (see graphic, page 66). These proportions remain fairly constant across companies of different sizes, although there is a slight tendency for the bigger spenders to rely a bit more on outsourcing. Overall, spending on outsourcing increased 10% in 1999.

*Readers Digest*, for example,





# 1999 Network World Spending Survey



Griff Law, network manager for Northeast Georgia Health System in Gainesville, Ga., spent a good chunk of his firm's 1999 network budget on Y2K work, an ERP network and VPN services.

recently outsourced remote access to reduce its support costs. "People cost more than hardware, particularly with remote access, where there's an assumption on the users' part that when you're home at 8 p.m., there's someone there to help you," says Robert Kuron, associate director of desktop integration services for the Pleasantville, N.Y., publication. "We don't want to add a second or third shift."

Moreover, *Readers Digest* has outsourced all of its Internet hosting, for similar cost control reasons. "You start hosting your own Web servers, you need someone there all the time," says Kuron.

Given the demand for high-tech talent and the need to retain workers, it's no surprise that the average respondent shelled out 16% more on

staffing in 1999. Nearly half of you expanded your regular IT staff and 25% increased your reliance on contract and temporary workers. As you might expect, the companies that spent more than \$500,000 on their networks were hit the hardest by increasing labor costs.

But the budget area where spending increased the most was capital equipment, which rose an average of 26%. Two-thirds of you implemented major network projects last year, including more than half of the companies that invested less than \$100,000 in their networks and almost 80% of those that spent more than \$500,000. LAN, WAN and Internet/intranet upgrades were fairly common, but only 13% of you began building a converged voice/data network.

Chee Lee, network designer at Nassau College in Garden City, N.Y., says convergence will be a big budget item but not before 2001. "We're a public institution and have to go through the state government and explain to them why this will save a lot of money," he says. "There's a lot of lobbying going on right now."

Then there are companies like *Readers Digest* that still have to do some major depreciation before seriously looking at moving voice onto IP networks. The company spent \$700,000 to replace its PBX two years ago. "To replace that right away with IP phones at \$500 each would be pretty expensive. Besides, I'd be shocked if an NT box would be as reliable," Kuron says. He won't seriously consider investing in the new technology for three to five years, he adds.

Several respondents cited enterprise resource planning (ERP) systems as major drivers for network upgrades. Northeast Georgia Health System, for example, is migrating from a mainframe-based financial and human resources system to an AIX-based ERP system that will automate several manual processes. The move is expected to save about \$500,000 the first year, says Griff Law, network manager for the health care provider in Gainesville, Ga.

And last year, the medical center rolled out a wireless network that lets administrators perform bedside patient registration and move people in and out of the emergency room much faster and more efficiently.

Brian Tomaszewicz, a former software engineer for a major global insurance firm, says the company made a slew of upgrades as part of an ERP rollout. The project required upgrading servers and work-

stations, moving to Category 5 wiring, migrating to switched Ethernet and upgrading hubs.

At the same time, many of you had to delay upgrades and other major initiatives. It follows reason that the more a company invested in its networks in 1999, the less likely it was that it needed to postpone projects.

## Popular purchases

Whether companies overhauled their networks or simply replaced equipment as needed, the majority of respondents purchased hubs, routers, network operating systems, network management tools, Web servers and firewalls in 1999. Layer 2, Layer 3 and Gigabit Ethernet switches were common purchases, but ATM and token-ring switches neared the bottom of the shopping list (see graphic, page 67).

While 31% of respondents invested in virtual private networks (VPN) last year, that doesn't necessarily mean they've gone into full-throttle rollout. Nassau College implemented a VPN in 1998, but the project wasn't a big budget item. "It's still in the testing phase," Lee says.

However, Northeast Georgia Health System has big plans for VPNs. "VPNs are a definite for us, we're halfway there," Law says. The organization is in the trial stages of a VPN-based service called Physician Link, which will allow doctors to dial in for patient records and results. "It's not necessarily a big ticket item, but it will change the way doctors and clinicians work."

## SPENDING SPECIFICS

Only on Fusion: More survey results.

Compare and contrast: Results of our 1998 spending survey.

Fun with numbers: How to plan an IT budget.

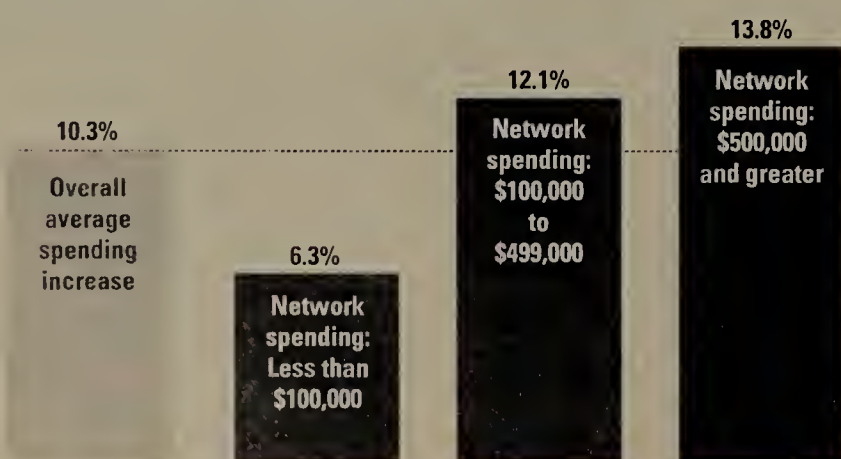
Savvy savings: Budget-stretching maneuvers.

Cutting costs: Tips for reducing telecom expenses.



## THE RICH GET RICHER

Companies with the largest network budgets also scored the largest percentage increases in 1999.



## CAPITAL PUNISHMENT

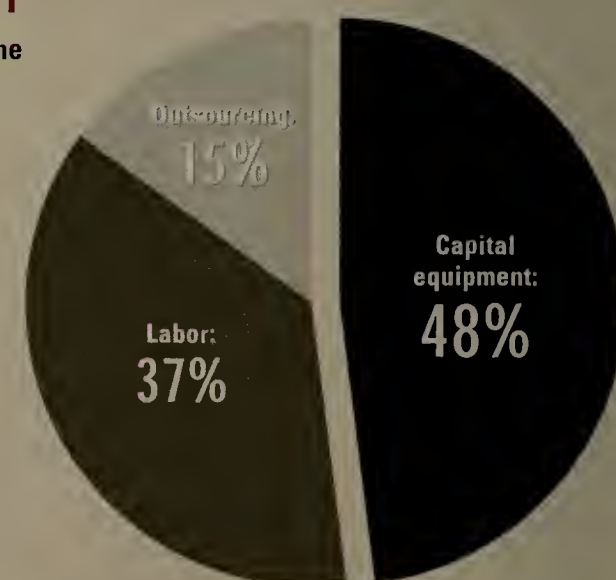
Capital equipment purchases take the biggest bite out of overall budgets.

- Capital equipment: 48%
- Labor costs: 37%
- Outsourcing: 15%

## CAPITAL GAINS

Spending on capital equipment increased more than other categories in 1999.

- ↑ Capital equipment: up 26%
- ↑ Labor costs: up 16%
- ↑ Outsourcing: up 10%





Only 11% of you spent money on directories in 1999, indicating that many are waiting for Windows 2000 to ship in February.

Nassau College plans to implement Active Directory this year and migrate everything to Win 2000, Lee says.

Not everyone will jump on Win 2000 out of the box, either. *Readers Digest* is looking at moving to either Win 2000 or NT in 2001. "We have some antiquated applications we have to do work on first," Kuron says.

And Northeast Georgia Health intends to wait for Version 1.1 of Win 2000, according to Law. "We're an NDS shop, and we see no reason to move to Active Directory and go through the same growing pains we went through moving to NetWare 4," he says. The firm will likely begin moving to Win 2000 Professional desktops in November.

## Money-saving measures

Relative to the tasks you needed to accomplish in 1999, the majority of you regarded your resources as at least as good as those you used the year before. But this doesn't necessarily mean that funding was satisfactory.

Despite receiving an average budget increase of 10% last year, more than half of the respondents described their financial resources as inadequate. One reason could be that in 1999 respondents gained additional sites and end users to support thanks to corporate growth, mergers and acquisitions.

However, a fortunate 4% admitted to having more resources than needed to do the job. Here's a tip: it's probably best not to share this with your boss or company stockholders.

Whether your budget was ample or paltry, almost all of you employed spending strategies to get the most bang for your buck (see graphic, this page). The most popular step involved timing purchases, which more than half of all respondents reported doing. Next came server consolidation, particularly for the companies with larger budgets. Naturally, companies with more extensive networks are substantially more likely to invest in remote software and remote management.

Just over a quarter of the network executives surveyed are moving functions to the Web to save money. Reseller Dynamic Solutions International of Englewood, Colo., is taking that idea one step further.

The company is looking to sell one of its prod-

uct lines via the existing Web infrastructures of vendor partners. That way, "we don't have to allocate large amounts of money or budget for large expenditures," says Marshall Clark, one of the firm's regional sales managers who has input into network purchases.

Since there's no telling what the next year will bring, it doesn't hurt to save IT money anywhere you can. Take Northeast Georgia Health System, for example. After a few growth years, the health care industry is seeing some belt tightening due to Medicare cutbacks and HMO-related trimming. Law's IT department has been trying to build up cash reserves for future lean times and expected changes in the health care industry.

## FOOTING THE BILL FOR Y2K

**Y**2K remediation work accounted for 20% of network spending in 1999, according to our survey.

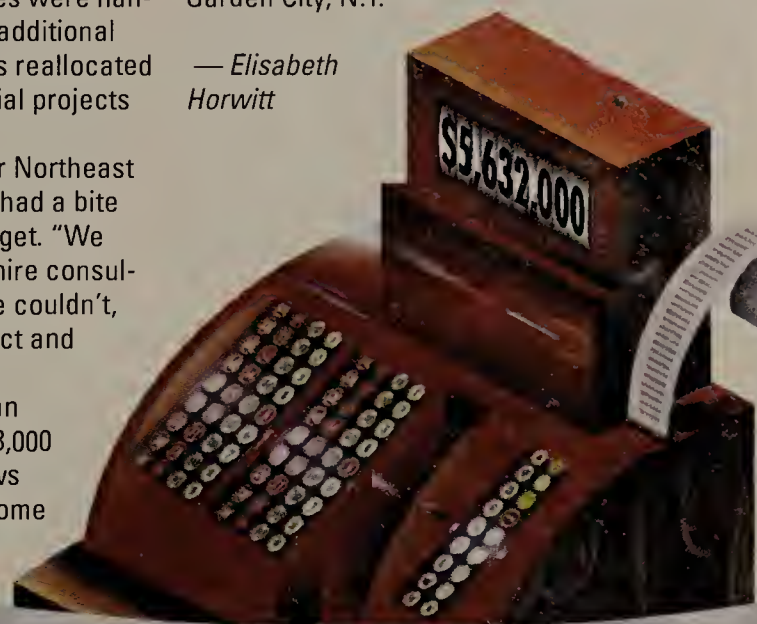
More than half of you said that Y2K compliance had an impact on your overall spending, but were divided fairly evenly over how those expenses were handled. Some companies set aside additional funds for the project, while others reallocated existing money and put unessential projects on hold.

Griff Law, network manager for Northeast Georgia Health System, said Y2K had a bite on the health care provider's budget. "We had to pull out special reserves, hire consultants to modify pieces of code we couldn't, and pay for things we didn't expect and didn't allocate for," he says.

Another reader spent more than \$20 million to migrate more than 3,000 PCs from Windows 3.1 to Windows NT and 95, including upgrading some hardware.

However, several respondents got the conversion work done early. For example, Nassau College covered Y2K remediation in its 1997 budget. "We have a lot of legacy computers, so we had to do it early," says Chee Lee, network designer for the school in Garden City, N.Y.

— Elisabeth Horwitt



One big change for the health care provider is the need to implement high levels of encryption within the next 24 to 36 months, as specified by the Health Care Insurance Supportability and Accountability Act. "We're trying to validate necessity more closely than in the past, fine-tuning applications when we used to just throw in new hardware," Law says.

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## SHOPPING LIST

Here are the most common products respondents purchased for their networks in 1999.

Product	Percentage	Product	Percentage
Hubs	67%	VPN equipment	31%
Routers	65%	Video-conferencing	29%
Network operating systems	65%	Gigabit Ethernet switches	28%
Network management tools	62%	Wireless equipment	28%
Web servers	58%	Messaging/Collaboration tools	27%
Firewalls	54%	E-commerce software	19%
Servers (other than Web)	46%	ATM switches	17%
Remote access devices	39%	Caching/load balancing tools	17%
Layer 3 switches	34%	Directories	11%
Layer 2 switches	32%	Token-ring switches	5%

## BUDGET-STRETCHING STRATEGIES

Regardless of the size of the network budget they had to work with, most network managers took steps to make their money go further

Strategy	Less than \$100,000	\$100,000 to \$499,000	\$500,000 and greater	Average
Timing purchases	57%	59%	51%	56%
Server consolidation	27%	39%	46%	36%
Remote management	17%	33%	40%	28%
Moving functions to the Web	18%	27%	37%	26%
Outsourcing	21%	23%	33%	24%
Remote software distribution	13%	25%	31%	22%
Equipment leasing	13%	21%	21%	18%
Using service providers	12%	12%	21%	14%
Thin clients	8%	15%	17%	13%





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# GEARING UP

**It's back to business on network, e-commerce projects delayed by Y2K.**

BY SHARON GAUDIN

**W**ith the worst Y2K worries behind them, network executives are now turning to projects that were waylaid last year because of preparations for the dreaded millennium bug.

E-commerce initiatives are at the top of many to-do lists. And network executives who replaced old software with new Y2K-compliant programs can't wait to take their brand-new systems out for a test drive to see what they can do.

"This should be the era of stability and payback," says Brian Moses, an assistant vice president at Lombard Canada, a major Toronto insurance firm. "Y2K coincided with the Internet revolution. Now we need to see how we can leverage all the Y2K investments we made in infrastructure for e-commerce. It's payback time."

Moses is just one of the thousands of IT managers getting his team back on track after diverting time and budgets to concentrate on millennium worries. According to a PricewaterhouseCoopers survey of 100 U.S. companies with more than \$100 million in revenue, 50% said they had deferred or aborted projects because of Y2K.

And three-fourths of the companies said they would resume that work in the first quarter of this year. In fact, work on deferred projects already has begun at Lombard Canada.

Moses intends to use the upgraded network — new Windows NT 4.0 servers, Cisco routers and non-mainframe applications — as the base for building a Web site and launching an e-commerce initiative.

Lombard has been using IBM's Information Network, a mail exchange facility, for some rudimentary electronic mailing and e-commerce, spending \$25,000 to \$30,000 per month on communication expenses alone.

This year he hopes to have enough of a Web presence to handle 40% to 50% of certain types of transactions and communications online. Those transactions, such as new business submissions, endorsements, name changes or policy renewals, should be handled 100% online by next year, according to Moses' plan.

"We figure this will save us a half-million dollars over three years in communication costs alone," Moses says. "We overhauled a lot of processes and



systems, and now we can use that to our advantage."

Kalman Shor, director of IS at Michael Anthony Jewelers, a Mt. Vernon, N.Y., jewelry manufacturer and supplier, also is using the upgrades his company made for Y2K to build a Web presence.

"We have a pretty much static, informational Web site right now," Shor says. "We're going to Internet-enable our business-to-business work. It will allow us to react quicker to our customers' needs."

Shor, who says Michael Anthony diverted about 30% to 35% of its IT budget to Y2K, also is moving quickly to start a project to automate the company's shop floors, giving special attention to tracking materials.

"We have immediately started on three new projects," Shor says, noting that the two top projects are the shop floor automation and the e-commerce push. "We came in here [after the Y2K rollover] and everything was fine, so we just started working on our new projects."

Jane Burke, an analyst at Boston's PricewaterhouseCoopers, notes e-commerce is one of the top projects that IT managers are eager to dive into this year.

"Companies have been experimenting with it and now that they're freed up, this is the chance to really get into it," Burke says. "People are looking to offer additional products over the Web, get into markets they haven't been in before and work with new partners."

And that's exactly what IT managers are looking to do at L.L. Bean, the Freeport, Maine, outdoor retail giant.

"I imagine that things will pick up now that Y2K is over," says Shawn Gorman, marketing manager for e-commerce at L.L. Bean. "We're going to get 100%

of our 15,000 products online. Now we have about 60% of them up, but we want to have everything available online."

Site personalization is L.L. Bean's other big goal this year, Gorman notes. He wants the site to recognize that a woman logging on is more likely to be an apparel shopper than a hardcore outdoor adventurer. That way the page she sees will be tailored to her. With the IT team at L.L. Bean no longer focusing on digits and rollover worries, Gorman says they'll be able to focus on these projects.

Y2K preparations have put one major U.S. data warehouse and e-commerce company in a good position for this year, according to the company's lead network analyst.

"Y2K was more of an interruption than anything else," says the network analyst. "Our 2000 budget was cut in half, and that money was diverted to Y2K."

Now that the millennium has rolled by without any discernable hitches, it's time for the company to get back to work on moving several hundred users off modem connections.

Some companies, however, aren't going to leap headfirst into new projects — not until they're sure that all possible Y2K hazards are behind them. The two biggest dates that caused Y2K nightmares — the Jan. 1 rollover and the first day back to business on Jan. 3 — have passed, but companies still have to get beyond the first month-end reports and the upcoming leap year day.

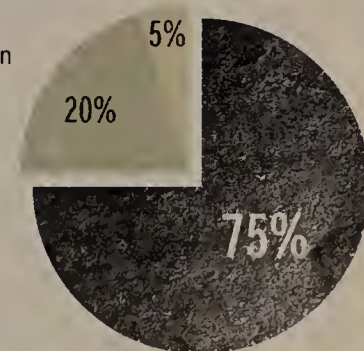
"I'm 95% looking at the business at hand and 5% keeping an eye on Y2K," says Russ Schadd, a network specialist at Wallace Computer Services in Lisle, Ill. "We had 20 to 40 people dedicated to the Y2K project, and they'll be returning to their normal duties. ... But we're not through this thing yet. We'll be back to work as soon as this is all said and done." ■

## Picking up the pieces

**With Y2K bug fears over, the focus shifts to new projects. In a survey of 100 U.S.-based companies, 50% said their companies had deferred or aborted system implementation projects due to Y2K.**

When companies plan to start on deferred projects:

■ Q1 2000  
■ Q2 2000  
■ Undetermined

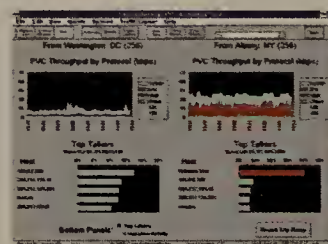


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**I**t all boils down to what you're looking for in a network operating system (NOS).

Do you want it lean and flexible so you can install it any way you please? Perhaps administration bells and management whistles are what you need so you can deploy several hundred servers. Or maybe you want an operating system that's robust enough so that you sleep like a baby at night?

The good news is that there is a NOS waiting just for you. After the rash of recent software revisions, we took an in-depth look at four of the major NOSes on the market: Microsoft's Windows 2000 Advanced Server, Novell's NetWare 5.1, Red Hat Software's Linux 6.1 and The Santa Cruz Operation's (SCO) UnixWare 7.1.1. Sun declined our invitation to submit Solaris because the company says it's working on a new version.

Microsoft's Windows 2000 edges out NetWare for the Network World Blue Ribbon Award. Windows 2000 tops the field with its management interface, server monitoring tools, storage management facilities and security measures.

However, if it's performance you're after, no product came close to Novell's NetWare 5.1's numbers in our exhaustive file service and network benchmarks. With its lightning-fast engine and Novell's directory-based administration, NetWare offers a great base for an enterprise network.

We found the latest release of Red Hat's commercial Linux bundle led the list for flexibility because its modular design lets you pare down the operating system to suit the task at hand. Additionally, you can create scripts out of multiple Linux commands to automate tasks across a distributed environment.

While SCO's UnixWare seemed to lag behind the pack in terms of file service performance and NOS-based administration features, its scalability features make it a strong candidate for running enterprise applications.

#### The numbers are in

Regardless of the job you saddle your server with, it has to perform well at reading and writing files and sending them across the network.

# King of the NOS hill

**NetWare holds the performance reins, but Windows 2000 reigns supreme for features overall.**

BY JOHN BASS AND JAMES ROBINSON,  
NETWORK WORLD TEST ALLIANCE



Microsoft  
**Windows 2000  
Advanced Server**



Microsoft's brand-new Windows 2000 brings home the Network World Blue Ribbon Award for its administration utilities, security features and improved installation process.

We designed two benchmark suites to measure each NOS in these two categories. To reflect the real world, our benchmark tests consider a wide range of server conditions (see "How we did it," page 74).

NetWare was the hands-down leader in our performance benchmarking, taking first place in two-thirds of the file tests and earning top billing in the network tests.

Red Hat Linux followed NetWare in file performance overall and even outpaced the leader in file tests where the read/write loads were small. However, Linux did not perform well handling large loads — those tests in which there were more than 100 users. Under heavier user loads, Linux had a tendency to stop servicing file requests for a short period and then start up again.

Windows 2000 demonstrated poor write performance across all our file tests. In fact, we found that its write performance was about 10% of its read performance. After consulting with both Microsoft and Client/Server Solutions, the author of the Benchmark Factory testing tool we used, we determined that the poor write performance could be due to two factors. One, which we were unable to verify, might be a possible performance problem with the SCSI driver for the hardware we used.

More significant, though, was an issue with our test software. Benchmark Factory sends a write-through flag in each of its write requests that is supposed to cause the server to update cache, if appropriate, and then force a write to disk. When the write to disk occurs, the write call is released and the next request can be sent.

At first glance, it appeared as if

# NetworkWorld SHOWDOWN

#### ComNet lowdown

If you're attending the ComNet show in Washington, D.C. this week and want more firsthand information on how these network operating system (NOS) products stack up against each other, check out the complementary events sponsored by Network World.

#### The NOS Showdown

Join moderator and Network World Editorial Director John Gallant and representatives from IBM, Microsoft, Novell, Red Hat and The Santa Cruz Operation for a presidential-style debate on everything from NOS performance, scalability and cost of ownership to directory services and management tools. The debate will take place on Wed., Jan. 26 from 1 p.m. to 2:15 p.m. in the Grand Ballroom.

IN THE LAB

#### NOS Showdown Lab

Network World and Centennial Networking Labs offer a closer competitive look at Windows 2000 Advanced Server, NetWare, Red Hat Linux and SCO UnixWare. Get a hands-on, customizable view of how these NOSes compare in terms of file and network performance.

The lab is in the main lobby of the convention center and is open during show hours.



Windows 2000 was the only operating system to honor this write-through flag because its write performance was so poor. Therefore, we ran a second round of write tests with the flag turned off.

With the flag turned off, NetWare's write performance increased by 30%. This test proved that Novell does indeed honor the write through flag and will write to disk for each write request when that flag is set. But when the write through flag is disabled, NetWare writes to disk in a more efficient manner by batching

benchmark, Windows 2000 came out on top in the long TCP transaction test. Windows 2000 is the only NOS with a multithreaded IP stack, which allows it to handle network requests with multiple processors. Novell and Red Hat say they are working on integrating this capability into their products.

NetWare and Linux also registered strong long TCP test results, coming in second and third, respectively.

In the short TCP transaction test, NetWare came out the clear winner. Linux earned second place in spite

of its lack of support for abortive TCP closes, a method by which an operating system can quickly tear down TCP connections. Our testing software, Ganymede Software's Chariot, uses abortive closes in its TCP tests.

#### Moving into management

As enterprise networks grow to require more servers and support more end users, NOS management tools become crucial elements in keeping

networks under control. We looked at the management interfaces of each product and drilled down into how each handled server monitoring, client administration, file and print management, and storage management.

We found Windows 2000 and NetWare provide equally useful management interfaces.

Microsoft Management Console (MMC) is the glue that holds most of the Windows 2000 management functionality together. This configurable graphical user interface (GUI) lets you snap in Microsoft and third-party applets that customize its functionality. It's a two-paned interface, much like Windows Explorer, with a nested list on the left and selection details on the right. The console is easy to use and lets you configure many local server elements, including users, disks, and system settings such as time and date.

MMC also lets you implement management policies for groups of

users and computers using Active Directory, Microsoft's new directory service. From the Active Directory management tool inside MMC, you can configure users and change policies.

The network configuration tools are found in a separate application that opens when you click on the Network Places icon on the desktop. Each network interface is listed inside this window. You can add and change protocols and configure, enable and disable interfaces from here without rebooting.

NetWare offers several interfaces for server configuration and management. These tools offer duplicate functionality, but each is useful depending from where you are trying to manage the system. The System Console offers a number of tools for server configuration. One of the most useful is NWConfig, which lets you change start-up files, install system modules and configure the storage subsystem. NWConfig is sim-

ple, intuitive and predictable.

ConsoleOne is a Java-based interface with a few graphical tools for managing and configuring NetWare. Third-party administration tools can plug into ConsoleOne and let you manage multiple services. We think ConsoleOne's interface is a bit unsophisticated, but it works well enough for those who must have a Windows-based manager.

Novell also offers a Web-accessible management application called NetWare Management Portal, which lets you manage NetWare servers remotely from a browser, and NWAdmin32, a relatively simple client-side tool for administering Novell Directory Services (NDS) from a Windows 95, 98 or NT client.

Red Hat's overall systems management interface is called LinuxConf and can run as a graphical or text-based application. The graphical interface, which resembles that of MMC, works well but has some layout issues that make it difficult to use

**Table 2 — File benchmark scores**

The following table lists the overall performance scores for each NOS.

NOS	File performance score
NetWare	9.4
Red Hat Linux	6.7
Windows 2000 Advanced Server	5.6
UnixWare	3.3

together contiguous blocks of data on the cache and writing all those blocks to disk at once.

Likewise, Red Hat Linux's performance increased by 10% to 15% when the write through flag was turned off. When we examined the Samba file system code, we found that it too honors the write through flag. The Samba code then finds an optimum time during the read/write sequence to write to disk.

This second round of file testing proves that Windows 2000 is dependent on its file system cache to optimize write performance. The results of the testing with the write through flag off were much higher — as much as 20 times faster. However, Windows 2000 still fell behind both NetWare and RedHat Linux in the file write tests when the write through flag was off.

SCO honors the write through flag by default, since its journaling file system is constructed to maximize data integrity by writing to disk for all write requests. The results in the write tests with the write through flag on were very similar to the test results with the write through flag turned off.

For the network benchmark, we developed two tests. Our long TCP transaction test measured the bandwidth each server can sustain, while our short TCP transaction test measured each server's ability to handle large numbers of network sessions with small file transactions.

Despite a poor showing in the file

## ScoreCard

		Microsoft Windows 2000 Advanced Server	Novell NetWare 5.1	Red Hat Linux 6.1	SCO UnixWare 7.1.1
<b>Performance benchmarks:</b>					
File services	15%	5.6	9.4	6.7	3.3
Network	10%	8.4	9.6	7.4	7.5
<b>Administration/management:</b>					
Management interface	5%	8	8	5	7
Server monitoring	5%	8	6	6	6
Client administration	5%	7	8	4	6
File/print management	5%	8	8	5	6
Storage management	5%	9	7	6	5
Scalability	20%	8	5	6	8
Security	10%	9	8	7	5
Stability and fault tolerance	10%	8	6	7	7
Installation	5%	9	7	8	3
Documentation	5%	7	8	6	8
<b>Total score</b>		<b>7.78</b>	<b>7.61</b>	<b>6.35</b>	<b>6.10</b>

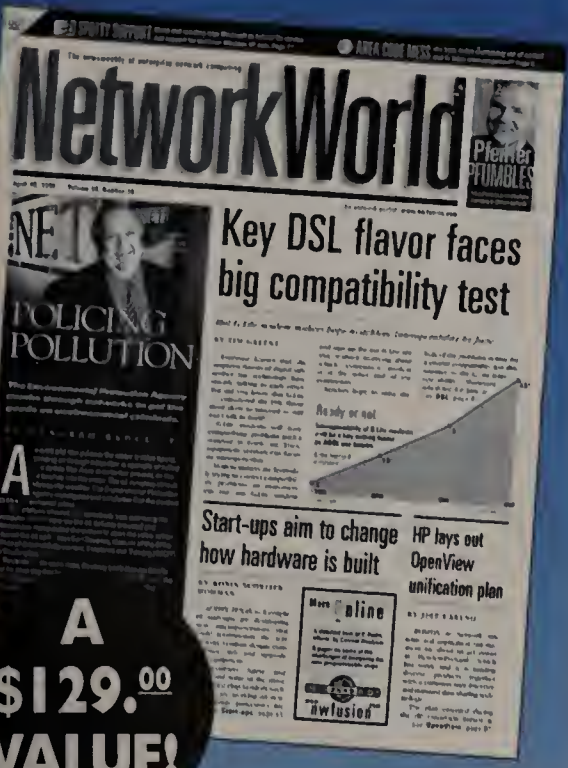
Individual category scores are based on a scale of 1 to 10. Percentages are the weight given each category in determining the total score.

**Table 3 — Network benchmark tests**

The following table shows the results from both of our Ganymede software Chariot tests.

NOS	Short TCP transaction test (in M bit/sec)				Long TCP transaction test (in M bit/sec)				Network score
	Run 1	Run 2	Avg.	Normalized score	Run 1	Run 2	Avg.	Normalized score	
NetWare	115.175	115.689	115.432	10.0	398.724	399.986	399.355	9.1	9.6
Windows 2000 Advanced Server	77.055	78.095	77.575	6.7	434.58	441.818	438.199	10.0	8.4
UnixWare	75.822	75.534	75.678	6.6	366.494	371.082	368.788	8.4	7.5
Red Hat Linux	97.415	98.909	98.162	8.5	273.081	273.267	273.174	6.2	7.4





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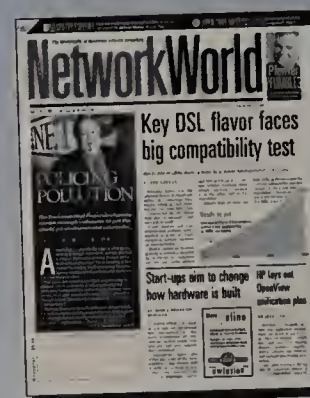
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at times. For example, when you run a setup application that takes up a lot of the screen, the system resizes the application larger than the desktop size.

Still, you can manage pretty much anything on the server from LinuxConf, and you can use it locally or remotely over the Web or via telnet. You can configure system parameters such as network addresses; file system settings and user accounts; and set up add-on services such as Samba — which is a service that lets Windows clients get to files residing on a Linux server — and FTP and Web servers. You can apply changes without rebooting the system.

Overall, Red Hat's interface is useful and the underlying tools are powerful and flexible, but LinuxConf lacks the polish of the other vendors' tools.

SCO Admin is a GUI-based front

end for about 50 SCO UnixWare configuration and management tools in one window. When you click on a tool, it brings up the application to manage that item in a separate window.

Some of SCO's tools are GUI-based while others are text-based. The server required a reboot to apply many of the changes. On the plus side, you can manage multiple UnixWare servers from SCOAdmin.

SCO also offers a useful Java-based remote administration tool called WebTop that works from your browser.

#### An eye on the servers and clients

One important administration task is monitoring the server itself. Microsoft leads the pack in how well you can keep an eye on your server's internals.

The Windows 2000 System Mon-

itor lets you view a real-time, running graph of system operations, such as CPU and network utilization, and memory and disk usage. We used these tools extensively to determine the effect of our benchmark tests on the operating system. Another tool called Network Monitor has a basic network packet analyzer that lets you see the types of packets coming into the server. Together, these Microsoft utilities can be used to compare performance and capacity across multiple Windows 2000 servers.

NetWare's Monitor utility displays processor utilization, memory usage and buffer utilization on a local server. If you know what to look for, it can be a powerful tool for diagnosing bottlenecks in the system. Learning the meaning of each of the monitored parameters is a bit of a challenge, though.

If you want to look at performance statistics across multiple servers, you can tap into Novell's Web Management Portal.

Red Hat offers the standard Linux command-line tools for monitoring the server,

such as iostat and vmstat. It has no graphical monitoring tools.

As with any Unix operating system, you can write scripts to automate these tools across Linux servers. However, these tools are typically cryptic and require a high level of proficiency to use effectively. A suite of graphical monitoring tools would be a great addition to Red Hat's Linux distribution.

UnixWare also offers a number of monitoring tools. System Monitor is UnixWare's simple but limited GUI for monitoring processor and memory utilization. The sar and rtpm command-line tools together list real-time system utilization of buffer, CPUs and disks. Together, these tools give you a good overall idea of the load on the server.

#### Client administration

Along with managing the server, you must manage its users. It's no surprise that the two NOSes that ship with an integrated directory service topped the field in client administration tools.

We were able to configure user permissions via Microsoft's Active Directory and the directory administration tool in MMC. You can group users and computers into organizational units and apply policies to them.

You can manage Novell's NDS and NetWare clients with ConsoleOne, NWAdmin or NetWare Management Portal. Each can create users, manage file space, and set permissions and rights. Additionally, NetWare ships with a five-user version of Novell's ZENworks tool, which offers desktop administration services such as hardware and software inventory, software distribution and remote control services.

Red Hat Linux doesn't offer much in the way of client administration features. You must control local users through Unix permission configuration mechanisms.

UnixWare is similar to Red Hat Linux in terms of client administration, but SCO provides some Windows binaries on the server to remotely set file and directory permissions from a Windows client, as well as create and change users and their settings. SCO and Red Hat offer support for the Unix-based Network Information Service (NIS). NIS is a store for network information like logon names, passwords and home directories. This integration helps with client administration.

#### Handling the staples: File and print

A NOS is nothing without the ability to share file storage and printers.

## Installing the NOSes

	Installation time	Comments
Red Hat Linux	30 minutes	Supports remote custom installations.
Windows 2000 Advanced Server	30 - 45 minutes	Asks all configuration questions upfront.
NetWare	30 - 45 minutes	Changing network configuration files requires a reboot.
UnixWare	1.5 - 2 hours	Confusing installation scripts are difficult to use.

## NetResults

### Windows 2000 Advanced Server

#### Microsoft

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[www.microsoft.com/windows2000/default.asp](http://www.microsoft.com/windows2000/default.asp)

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- ▲ Strong, easy-to-use, centralized management console.
- ▲ Support for policy-based management.
- ▲ Strong security measures.
- ▲ Excellent server monitoring tools.
- ▲ Smooth installation process.

#### Cons

- ▼ Huge system requirements.
- ▼ Poor file performance.

### NetWare 5.1

#### Novell

(801) 861-7000

[www.novell.com/netware5](http://www.novell.com/netware5)

**\$3,155** for server and 25 client licenses

#### Pros

- ▲ Great file and network performance.
- ▲ Simple management interface.
- ▲ Strong ties between directory and administration tools.

#### Cons

- ▼ Server monitoring tools lacking.

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- ▲ Flexible deployment options.
- ▲ Inexpensive.
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- ▲ Command line interface lends itself to automation.

#### Cons

- ▼ Configuration tools not stable.
- ▼ Client administration tools lacking.
- ▼ No integrated directory service.

### UnixWare 7.1.1

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#### Pros

- ▲ Interesting application management interface in Tarantella technology.
- ▲ Good remote server administration.
- ▲ Very scalable.
- ▲ Good documentation.

#### Cons

- ▼ Horrendous install.
- ▼ Low performance.
- ▼ No integrated directory service.



Novell and Microsoft collected top honors in these areas.

You can easily add and maintain printers in Windows 2000 using the print administration wizard, and you can add file shares using Active Directory management tools. Windows 2000 also offers Distributed File Services, which let you combine files on more than one server into a single share.

Novell Distributed Print Services

(NDPS) let you quickly incorporate printers into the network. When NDPS senses a new printer on the network, it defines a Printer Agent that runs on the printer and communicates with NDS. You then use NDS to define the policies for the new printer.

You define NetWare file services by creating and then mounting a disk volume, which also manages volume policies.

Red Hat includes Linux's print-tool utility for setting up server-connected and networks printers. You can also use this GUI to create printcap entries to define printer access.

Linux has a set of command-line file system configuration tools for mounting and unmounting partitions. Samba ships with the product and provides some integration for Windows clients. You can configure Sam-

ba only through a cryptic configuration ASCII file — a serious drawback.

UnixWare provides a flexible GUI-based printer setup tool called Printer SetUp Manager. For file and volume management, SCO offers a tool called VisionFS for interoperability with Windows clients. We used VisionFS to allow our NT clients to access the UnixWare server. This service was easy to configure and use.

## How we did it

We tested each NOS on Compaq ProLiant 1600 servers with dual 650MHz Pentium III CPUs, 512K-byte L2 cache and 640M bytes of RAM. The data partition consisted of 14 9.1G-byte drives loaded in a Compaq RAID Array 4214 drive array connected to an on-board Ultra2 SCSI controller. The NOSes were loaded on a 9.1G-byte drive connected to a second on-board Ultra2 SCSI controller. This configuration increased the available bandwidth of the drive subsystem and alleviated the bandwidth bottleneck to the drives.

The client hardware consisted of four ProLiant 1600 machines with dual 600MHz Pentium III CPUs and 640M bytes of RAM. Two additional ProLiant 1600 machines had dual 400MHz Pentium II chips with 256M bytes of RAM. Each client system ran Windows NT Server 4.0.

Servers and clients were connected to the network with Intel Pro 100+ network interface cards (NIC). A Cisco Catalyst 2900 switch with 24 10/100M bit/sec Ethernet ports completed the network configuration. All the NICs and switch ports were configured for 100M bit/sec full-duplex operation.

We used an additional Compaq 1600 with four Ethernet NICs as the control machine.

For our NOS benchmarking, we focused on file service and network performance. To test file service performance, we used Client/Server Solution's Benchmark Factory tool, which let us create tests that would stress each operating system's file subsystem. We configured the server to provide a Windows network file share for all clients using Windows System Message Block protocol over IP. We installed a benchmark agent on each client and modified the clients' LMHOSTS files to evenly distribute file transaction requests to the server.

We divided the tests into two categories — small and large file transfers.

For the small file transfer tests, we used a 3-D test matrix of transfer direction (read/write), block size (1K and 8K bytes) and transaction type (random/sequential), which resulted in eight individual tests. The small file transfer tests used a mix of 80% 1K-byte files, 10% 10K-byte files and 10% 50K-byte files.

All of these write transaction tests were conducted with a write through flag set in the Benchmark Factory software. This flag is set to simulate an application forcing a write through each operating system's cache to disk.

Because many applications do not force a write to disk, we asked Benchmark Factory to recompile its code with the write through flag turned off, and we reran the test with the new benchmark software build.

For the large file transfer tests, we combined reads and writes together in the same tests to emulate the behavior of large file service operations. We used a mix of 90% reads and 10% writes. We then created a set of four tests to cover all combinations of transfer type (random/sequential) and block size (1K and 8K bytes). The large file transfer tests used a mix of 80% 500K-byte files and 20% 1M-byte files.

All of these write transaction tests were conducted with the write through flag set in the Benchmark Factory software. We reran the tests



with the write through flag turned off.

The benchmarking agent created the files each virtual user needed at the beginning of each test. We ran five iterations of each test with an increasing load of virtual users starting at one and increasing to 200 by 50-user increments for the majority of our tests. However, for our sequential read/write tests we started at one and increased to 40 in 10-user increments. We did preliminary testing to establish the test parameters, then ran those parameters against each NOS.

We graphed the results of each file test on a curve with five data points. The curves have a knee followed by a plateau. We averaged the data points in the plateau to yield the score for the test.

We normalized the raw scores for each of the 20 file tests and then factored those normalized scores together to obtain a file benchmark score.

To test the network performance of each NOS, we used Ganymede Software's Chariot software, which differs from the Benchmark Factory software in that all file transactions occur in memory. The disk subsystem is not utilized. We used Chariot to compare the efficiency of the NIC drivers and TCP/IP stacks as measured by the number of operations each NOS could perform before the processor was bottlenecked and to compare the baseline throughput of the servers.

For the TCP stack test, we only used two NICs on the server and disabled the other two. We set the IP subnet mask on all the machines to 255.255.252.0, which put 100.0.1.x and 100.0.2.x in the same subnet.

We set up several bidirectional streams of short TCP file transfers from each of the clients to the server. A TCP session was built and torn down for each 3K-byte file transferred. This put a heavy load on the processors. Because the processors are the bottleneck, this test indicates the efficiency of the TCP stack and NIC driver for each NOS.

We ran this test for 10 minutes and recorded the aggregate throughput value for all the streams.

We ran a second Ganymede test to get an idea of the average aggregate throughput of all four NICs on the server. The bidirectional streams between the Chariot endpoints were configured as a long TCP session with a large file size of 10M bytes. The tests opened a TCP session once when they began and then sent files for the duration of the test. The session was not closed until the end of the test. We ran this test for 10 minutes to get an average aggregate throughput measurement.

We averaged the short and long TCP file transaction results to get one number measured in megabits per second. This number was normalized to obtain the score for the network test.

We also took a qualitative look at each NOS's management tools, security measures, stability and fault-tolerance features, installation process and documentation.

We evaluated the usability of the overall management interface and how each product handled server monitoring, client administration, and file, print and storage management. We evaluated the scalability of each NOS based on its symmetric multiprocessor ability, failover clustering support and load-balancing clustering ability. For our security evaluation, we examined password file encryption, password and user ID encryption over the network, and any advanced security features offered. For stability and fault tolerance, we looked at each product's software RAID capabilities, backup and restore utilities, and memory protection.



### Storage management

Windows 2000 provides the best tools for storage management. Its graphical Manage Disks tool for local disk configuration includes software RAID management; you can dynamically add disks to a volume set without having to reboot the system. Additionally, a signature is written to each of the disks in an array so that they can be moved to another 2000 server without having to configure the volume on the new server. The new server recognizes the drives as members of a RAID set and adds the volume to the file system dynamically.

NetWare's volume management tool, NWConfig, is easy to use, but it can be a little confusing to set up a RAID volume. Once we knew what we were doing, we had no problems formatting drives and creating a RAID volume. The tool

authentication with smart cards. Microsoft provides a Security Configuration Tool that integrates with MMC for easy management of security objects in the Active Directory Services system, and a new Encrypting File System that lets you designate volumes on which files are

automatically stored using encryption.

Novell added support for a public-key infrastructure into NetWare 5 using a public certificate schema developed by RSA Security that lets you tap into NDS to generate certificates.

Red Hat offers a basic Kerberos authentication mechanism. With Red

Hat Linux, as with most Unix operating systems, the network services can be individually controlled to increase security. Red Hat offers Pluggable Authentication Modules as a way of allowing you to set authentication policies across programs running on the server. Passwords are protected

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looks a little primitive, but we give it high marks for functionality and ease of use.

Red Hat Linux offers no graphical RAID configuration tools, but its command line tools made RAID configuration easy.

To configure disks on the UnixWare server, we used the Veritas Volume Manager graphical disk and volume administration tool that ships with UnixWare. We had some problems initially getting the tool to recognize the drives so they could be formatted. We managed to work around the disk configuration problem using an assortment of command line tools, after which Volume Manager worked well.

### Security

While we did not probe these NOSes extensively to expose any security weaknesses, we did look at what they offered in security features.

Microsoft has made significant strides with Windows 2000 security. Windows 2000 supports Kerberos public key certificates as its primary authentication mechanism within a domain, and allows additional



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with a shadow file. Red Hat also bundles firewall and VPN services.

UnixWare has a set of security tools called Security Manager that lets you set up varying degrees of intrusion protection across your network services, from no restriction to turning all network services off. It's a good man-

agement time saver, though you could manually modify the services to achieve the same result.

#### Stability and fault tolerance

The most feature-rich NOS is of little value if it can't keep a server up and running. Windows 2000

offers software RAID 0, 1 and 5 configurations to provide fault tolerance for onboard disk drives, and has a built-in network load-balancing feature that allows a group of servers to look like one server and share the same network name and IP address. The group decides which server will

service each request. This not only distributes the network load across several servers, it also provides fault tolerance in case a server goes down. On a lesser scale, you can use Microsoft's Failover Clustering to provide basic failover services between two servers.

As with NT 4.0, Windows 2000 provides memory protection, which means that each process runs in its own segment.

There are also backup and restore capabilities bundled with Windows 2000.

Novell has an add-on product for NetWare called Novell Cluster Services that allows you to cluster as many as eight servers, all managed from one location using ConsoleOne, NetWare Management Portal or NWAdmin32. But Novell presently offers no clustering products to provide load balancing for applications or file services. NetWare has an elaborate memory protection scheme to segregate the

#### SMP processing scalability

	CPU's supported
UnixWare	32
NetWare	32
Red Hat Linux	16
Windows 2000 Advanced Server	8

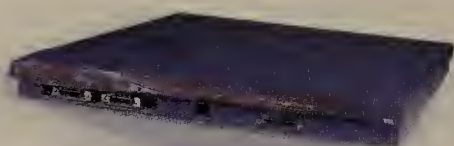
memory used for the kernel and applications, and a Storage Management Services module to provide a highly flexible backup and restore facility. Backups can be all-inclusive, cover parts of a volume or store a differential snapshot.

Red Hat provides a load-balancing product called piranha with its Linux. This package provides TCP load balancing between servers in a cluster. There is no hard limit to the number of servers you can configure in a cluster. Red Hat Linux also provides software RAID support through command line tools, has memory protection capabilities and provides a rudimentary backup facility.

SCO provides an optional feature to cluster several servers in a load-balancing environment with Non-Stop Clustering for a high level of fault-tolerance. Currently, Non-Stop Clustering supports six servers in a cluster. UnixWare provides software RAID support that is managed using SCO's On-Line Data Manager feature. All the standard RAID levels are supported. Computer Associates' bundled ArcServeIT 6.6 provides backup and restore capabilities. UnixWare has

Continued on page 78

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Continued from page 76

memory protection capabilities.

#### Documentation

Because our testing was conducted before Windows 2000's general availability ship date, we were not able to

evaluate its hard-copy documentation. The online documentation provided on a CD is extensive, useful and well-organized, although a Web interface would be much easier to use if it gave more than a couple of sentences at a time for a particular help topic.

NetWare 5 comes with two manu-

als: a detailed manual for installing and configuring the NOS with good explanations of concepts and features along with an overview of how to configure them, and a small spiral-bound booklet of quick start cards. Novell's online documentation is very helpful.

Red Hat Linux comes with three manuals — an installation guide, a getting started guide and a reference manual — all of which are easy to follow.

Despite being the most difficult product to install, UnixWare offers the best documentation. It comes with two manuals: a system handbook and a getting started guide. The system handbook is a reference for conducting the installation of the operating system. It does a good job of reflecting this painful experience. The getting started guide is well-written and well-organized. It covers many of the tools needed to configure and maintain the operating system. SCO's online documentation looks nice and is easy to follow.

#### Wrapping up

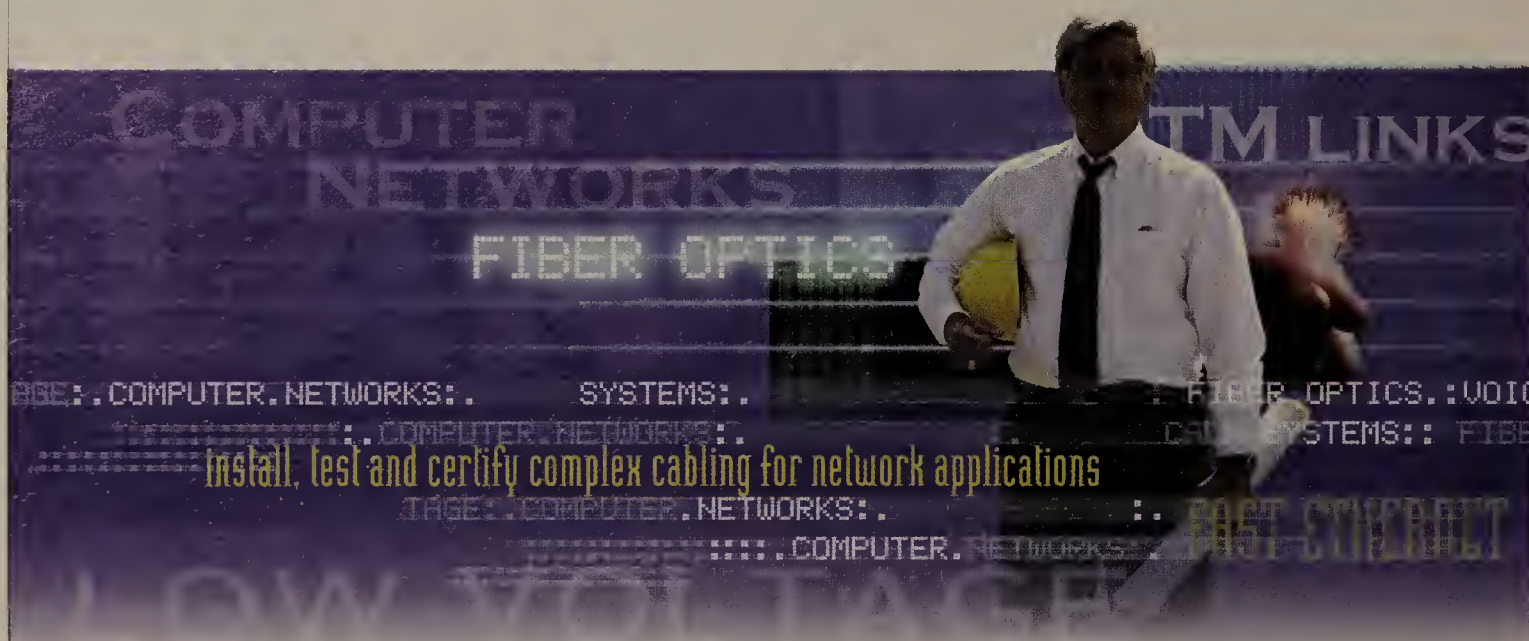
The bottom line is that these NOSes offer a wide range of characteristics and provide enterprise customers with a great deal of choice regarding how each can be used in any given corporate network.

If you want a good, general purpose NOS that can deliver enterprise-class services with all the bells and whistles imaginable, then Windows 2000 is the strongest contender. However, for high performance, enterprise file and print services, our tests show that Novell leads the pack. If you're willing to pay a higher price for scalability and reliability, SCO UnixWare would be a safe bet. But if you need an inexpensive alternative that will give you bare-bones network services with decent performance, Red Hat Linux can certainly fit the bill.

The choice is yours.

*Bass is the technical director and Robinson is a senior technical staff member at Centennial Networking Labs (CNL) at North Carolina State University in Raleigh. CNL focuses on performance, capacity and features of networking and server technologies and equipment. They can be reached at john\_bass@ncsu.edu and james\_robinson@ncsu.edu.*

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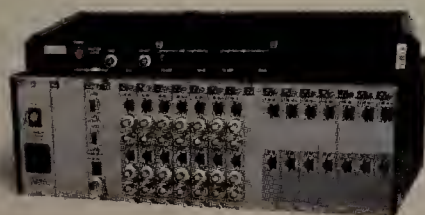


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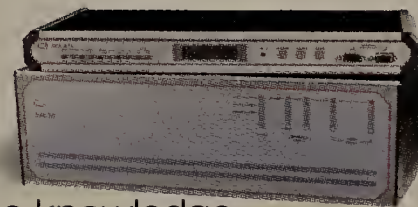
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# Management Strategies

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## Used goods

**Follow these guidelines for buying reconditioned network equipment without getting taken.**

BY TOM DUFFY

Last month, Chris Marler got a panicked call from the engineering department at Komatsu, Inc. in Vernon Hills, Ill. The department needed a gigabit of memory for a new design application, and it needed it ASAP. Marler, the data center manager for the construction equipment maker, could have ordered new memory chips from a manufacturer. Instead, he called his favorite dealer of used and reconditioned network gear and related computer products: Midwest Technology/Leasing of Schaumburg, Ill. Marler didn't investigate the cost of new memory, so he doesn't know whether he saved any money on the deal. But he does know that he saved time.

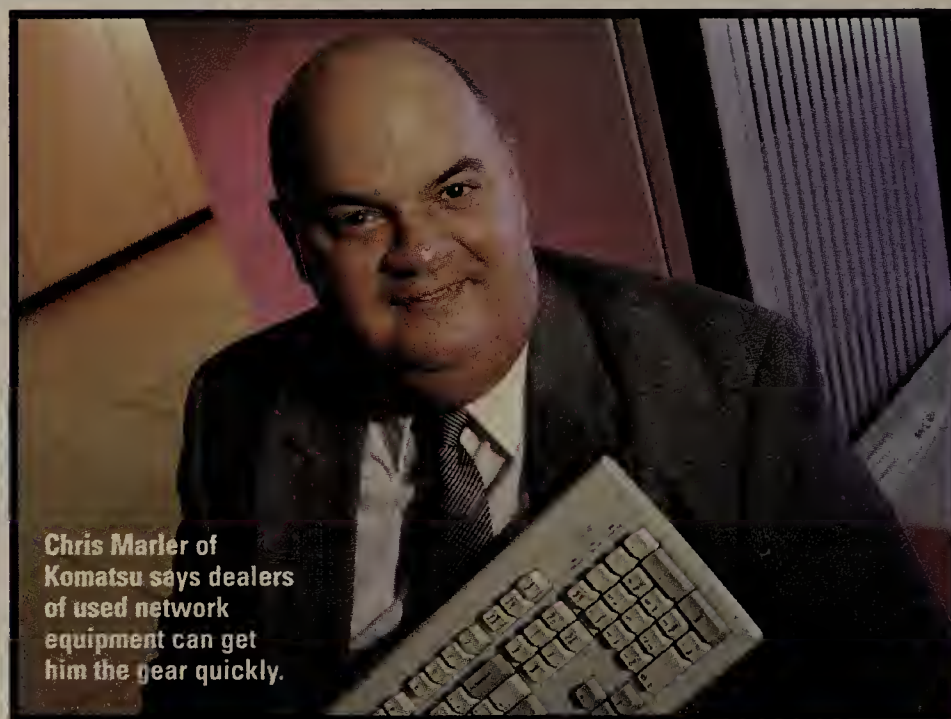
"We were got it overnight," he says. "It would have been closer to a week if we had called the manufacturer." Memory isn't the only product that Marler buys on the so-called gray market. Komatsu acquired most of its nonproduction servers second-hand.

Reconditioned IBM RS/6000s run SAP applications and are deployed in testing and laboratory environments, among other locales. While the savings can be as much as 50% off the price of new equipment, Marler stresses that speed of installation is often a more important factor.

Mike Ward, general manager of Mid-Atlantic Research and Services in Gaithersburg, Md., says Marler isn't alone. The used and reconditioned equipment dealer says the bulk of his customers are more interested in getting servers, routers and other products quickly than they are in trimming a few dollars off the purchase price.

"When customers call a manufacturer, usually they can't get to a product specialist quickly enough to convey the need and work out the deal," Ward says. "So when we get the panicked call it usually goes along the lines not of 'How much?', but 'When can you get it to me?'"

Still, it's nice to save money. David Ochroch, director of IT contract management for Sallie Mae, the student loan financial company in Reston, Va., buys used IBM 3174 servers to power part of the company's



Chris Marler of Komatsu says dealers of used network equipment can get him the gear quickly.

transaction processing system. Comparable new servers would cost upward of \$20,000. For similar used units, he pays between \$5,000 and \$10,000.

As with many financial organizations, Sallie Mae uses Tandem midrange computers to run its electronic funds transfer system. While the system is mission-critical, he says there's no need to buy the latest in replacement parts. So he often purchases Tandem-specific high-speed network controllers from an Arizona-based dealer that stockpiles used Tandem gear.

"You are dealing with a fairly stable system, not state-of-the-art. And it doesn't need to be," he says. "If a dump truck will work from point A to point B, why do you need a new Mercedes-Benz?"

Ochroch says he rarely buys routers, hubs and switches used, primarily because the price differential is not that great. And Ward and other gray-market retailers say the demand for used versions of those products is limited.

Ochroch and others advise potential buyers of used equipment to exercise some caution. When possible, look for equipment that is eligible to be certified for the original manufacturer's maintenance plan. Often that means checking directly with the manufacturer before making the purchase.

"That way, if something goes wrong, it's up to the OEM to make it right, so there's no finger-pointing when the product arrives," Ochroch says.

You also need to be more attuned to your specific needs. Used dealers often don't have the staff to send out a team of consultants to determine whether a particular product is suitable for its intended application.

And while some offer their own warranties for products they sell, others don't.

Mid-Atlantic Research and Services' Ward suggests taking a close look at the seller's operation. Check the condition of equipment at the time it is sent out and whether it is delivered with the manufacturer's latest engineering changes. He also recommends examining the network cables and demanding new ones when possible.

"Visit the provider," he says. "Find out how the equipment looks when they accept it. Ask to see their testing facility and meet their technicians... If you buy used, you're going to run into a technical support issue with finger-pointing. You

want to know they can support you when it gets into implementation."

Dealers of used network gear range from one-person operations to larger organizations where cost is less of an issue and service and warranties are generally better, according to Ochroch. Which you choose depends upon your needs.

"It's a matter of cost vs. risk," Ochroch says. "If the equipment isn't going someplace where you'll be fired if it doesn't work, you should get it as cheaply as possible. For us, in most cases, it's generally important enough that we need to be a little more careful about what we buy."

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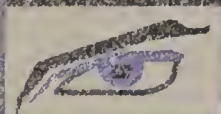
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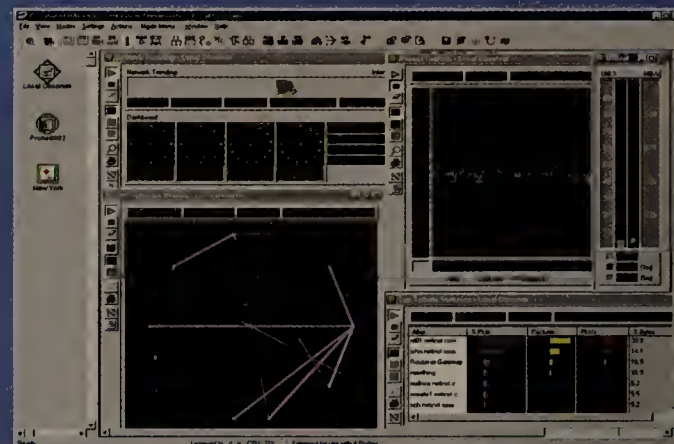
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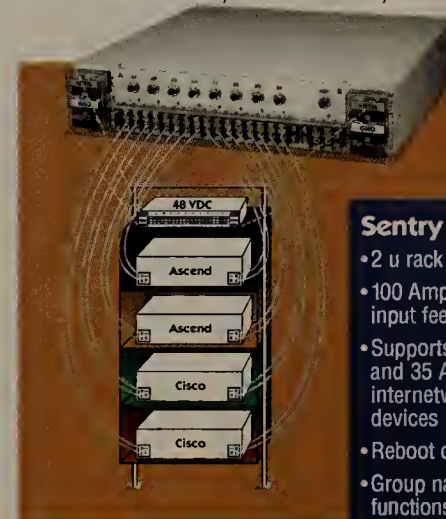
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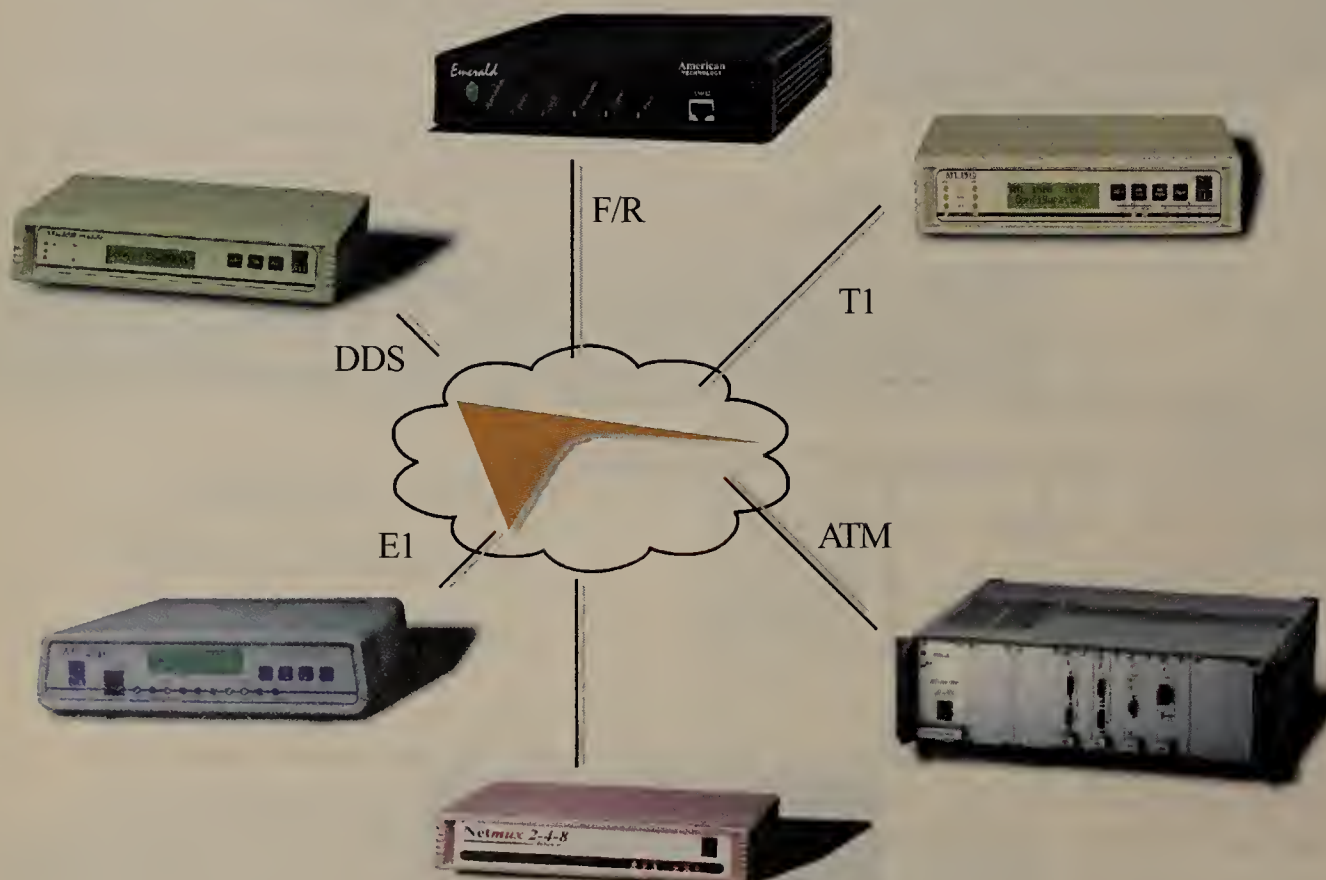
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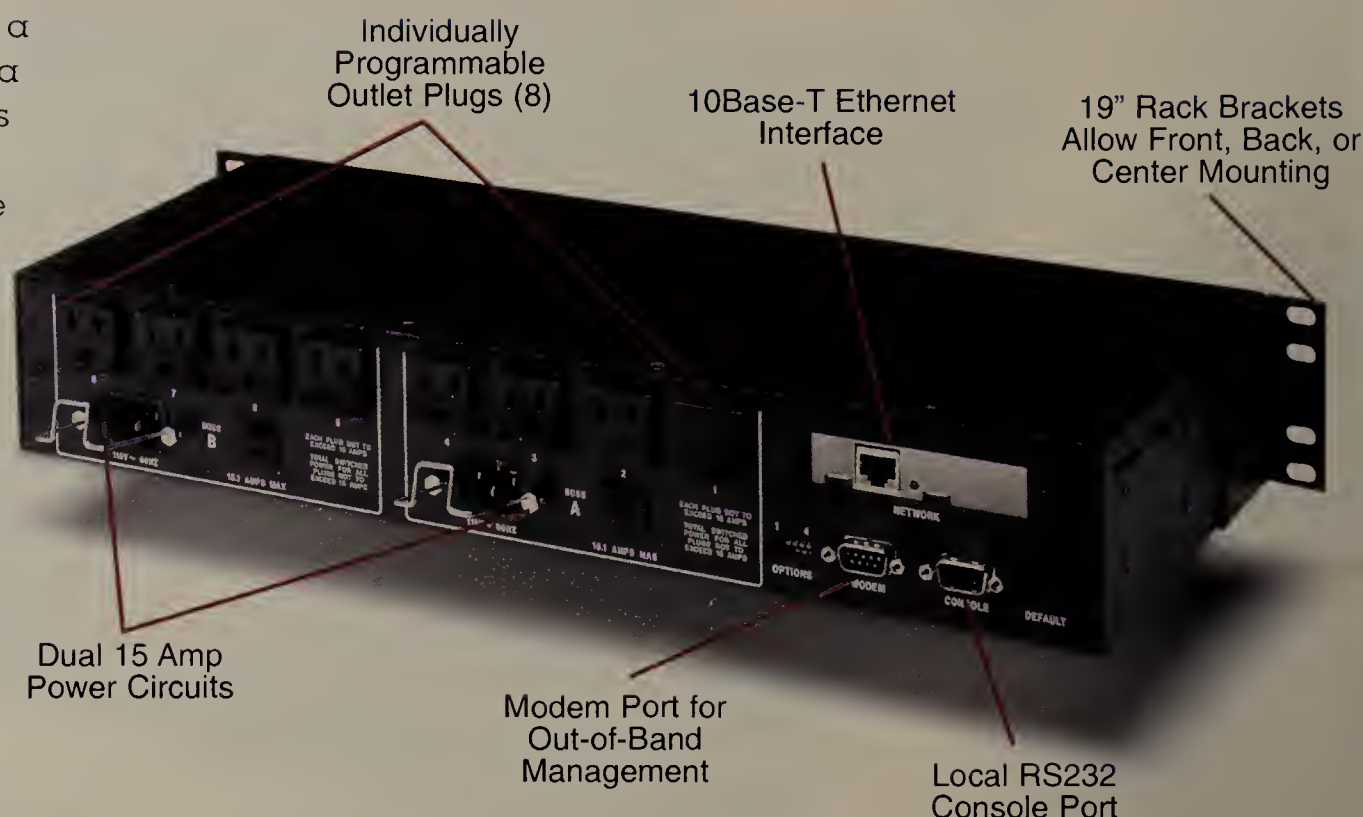


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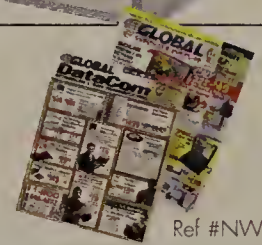


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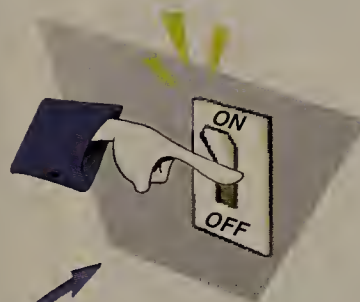
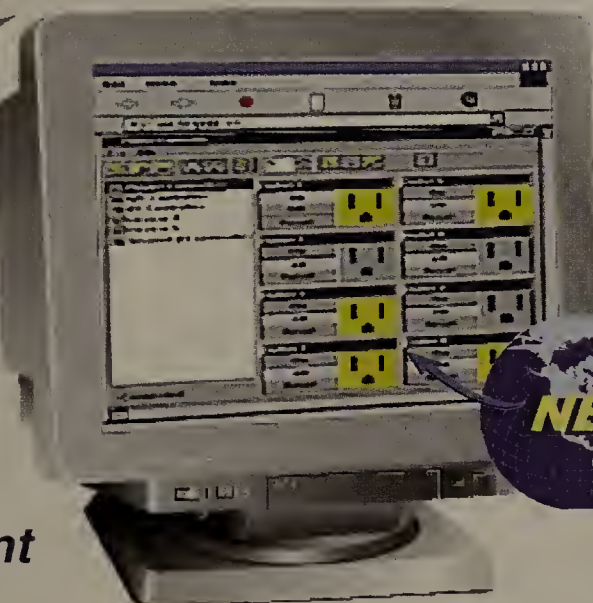
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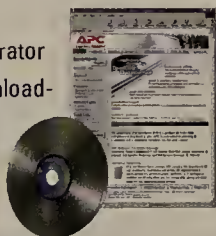
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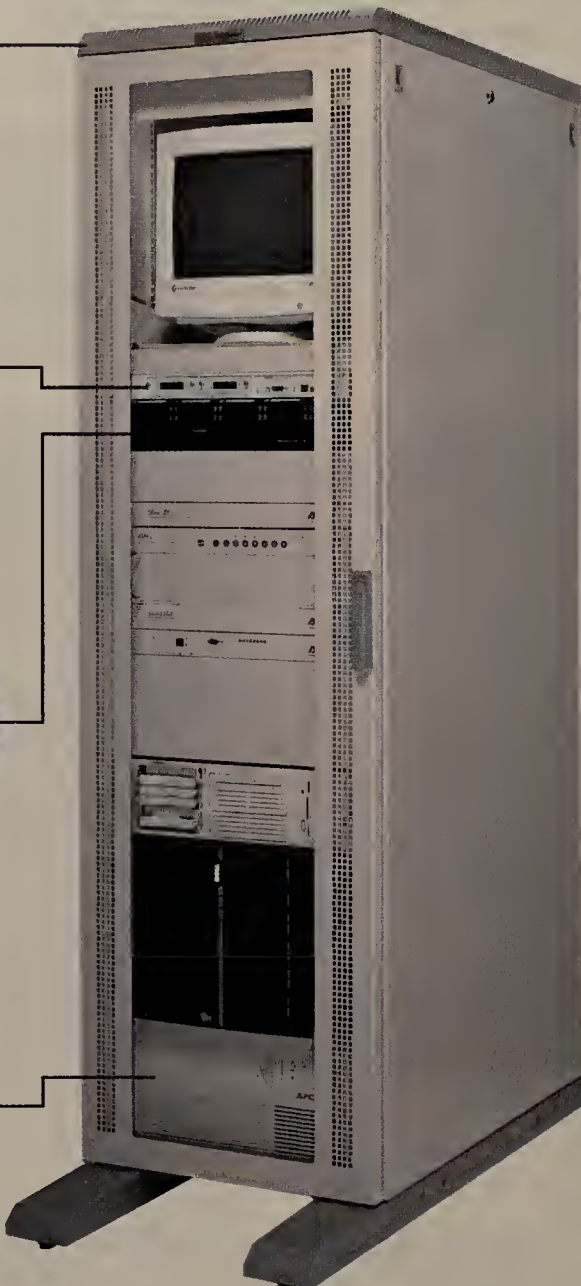
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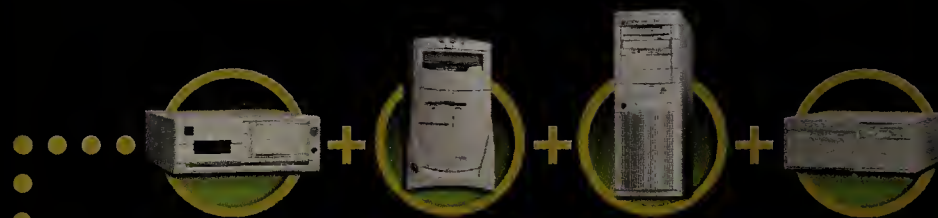
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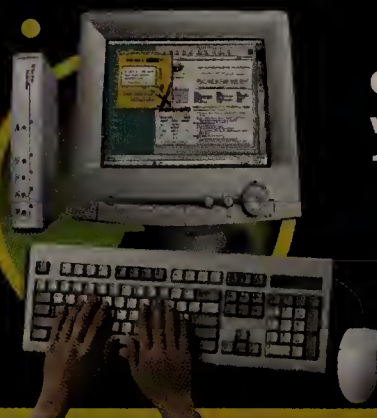


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- Feb. 14 • Windows 2000 planning guide.  
 • CompuWare Application Profiler.  
 • DNS management apps.
- Feb. 21 • Videoconferencing end point nodes.  
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responsible for design and development of Client Service and Internet and Intranet applications for the company and their clients. Help clients to be on the World Wide Web and allow them to perform electronic commerce and customer servicing. Develop these applications on UNIX/NT platform using C++ and Java languages. Write interface between front end and Sybase database. Must have a Bachelor's degree in Computer Science, Math, any engineering discipline or related field or foreign degree equivalent. Must have two years experience in job offered or position with same duties. Salary \$61,381/yr. Send resumes to: Kenneth Reaves at Software Research Associates Atlanta, LLC, 70 Mansell Court, Suite 100, Roswell, GA 30076.

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Software Engineer, Fairfield, CT; Analyze, design and develop software applications using Visual Basic, Oracle, PowerBuilder, MS SQL Server and Windows NT. Provide technical support. Req'd. Bachelors in Engineering or Computer Science or Math. 2 yrs exp in job offered or 2 yrs exp in a Computer Related Profession. 40 hrs/wk., 9a-6p.. Send resumes to: Nutech Consultancy Services, 501 Pemburn Drive, Fairfield, CT 06430. Attn: Ramesh Kumar.

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CTI Administrator wanted by Independent Financial Services Co in Parsippany, NJ. Must have Masters in Comp Sci, MIS or related field & 3 yrs exp creating CONVERSANT IVR applications, 1 yr. exp. developing and supporting Answersoft and DAVOX CTI applications and 1 yr exp. writing COM object applications. Respond to: Erica Tekal, HR Dept., CIT Group/Newcourt Financial USA, Inc., 650 CIT Drive, Livingston, New Jersey 07039.

DB Design Analyst needed to develop and maintain Internet based telephonic, E-Commerce based transaction processing & data warehousing systems. Apply to: Adi Data Int'l., 100 Franklin Sq. Dr. #205, Somerset, NJ 08873.

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Software Engineer sought by Computer Services Co in Colts Neck, NJ. Must have Masters in Comp Sci, Comp Engg or Elec Engg. Respond to: HR Dept., Communications Excellence, Inc., 11 Deputy Minister Dr, Colts Neck, NJ 07722.

Software Engineers needed for NJ IT Co. to analyze, design, develop software applications using Lotus Notes, Domino, HTML, JavaScript, Perl/CGI. Apply to: Global Consultants, 601 Jefferson Rd, Parsippany, NJ 07054.

Rayex, Inc., a Computer Services Co. in Skillman, NJ, seeks Programmer/Analysts with 6 mo. exp in planning, dvlp, testing & documenting in the following:  
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SAP Consultant wanted by New Jersey based S/ware Dvlp & Consulting Services Firm for job locs throughout US. Must have Bach in Comp Sci or Engg & 4 yrs s/ware exp. Respond to: HR Dept, Indus Consultancy Services, Inc., 140 E. Ridgewood Ave, Paramus, NJ 07652.

Senior Software Development Engineer wanted by Computer Modeling & Optimization S/ware & Services Co in Cambridge, MA. Must have Masters in Comp Sci, Engg or equiv & 2 yrs exp in s/ware engg. Respond to: HR Dept, Aspen Technology, Inc., 10 Canal Park, Cambridge, MA 02141.

Programmer Analyst, Malden, MA; Analyze, design, develop & test Attendance, Payroll and various systems using Client/Server architecture, Relational Data Modelling, C, DB/Lib & Sybase in HP-UX system. Req'd. Bachelors in Comp Scie. or Inf. & Systems Mgmt. 6 months exp in job offered. 40 hrs/wk., 9a-6p, \$60,000/yr. Applicants should submit two (2) copies of resume in response to Case #199983015, P.O.Box 8968, Boston, MA 02114.

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Programmer/Analyst wanted by Computer Consulting Co in Brooklyn, NY. Must have 2 yrs exp preparing program specifications, analyzing, dsng, dvlp, coding, testing & implementing programs for applics systems using C++. Respond to: HR Dept, Dataray, Inc., 1657 E 19th St, Brooklyn, NY 11229.

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Computer Services Co. in Edison, NJ seeks to fill the following job opening:  
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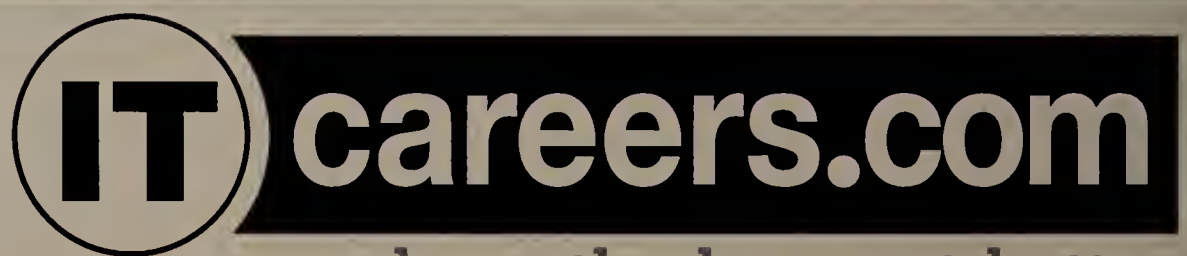


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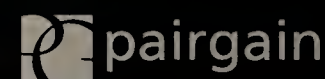
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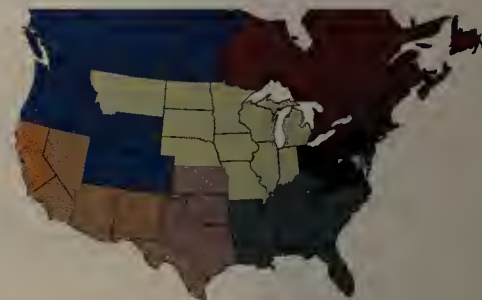
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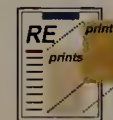


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IPv4,  
continued from page 1

Stanford will return an enormous block of unused Internet addresses — more than 16 million — to the organization that oversees 'Net address allocation in North America.

"In the early days, when there was address space galore, people weren't thinking that the Internet would turn into such a phenomenon," says Jay Kohn, assistant director of networking systems at Stanford. "But as members of the network community, we need to think about this issue and do the right thing. . . . It's important for people that have large address space like ours to be good network neighbors."

Although hailed as noble, some see Stanford's network re-engineering effort as more of a symbolic gesture than a real-world solution to the Internet address dilemma.

"Stanford's move is gracious and commendable, but it represents about 0.5% of the address space," says Christian Huitema, chief scientist in Telcordia Technologies' Internet Architecture Research Laboratory. Huitema asserts that for all practical purposes, the Internet community ran out of addresses in 1992, when the registries started clamping down on requests for space. "It would take many such moves" to make much of a difference, he adds.

Stanford's efforts are "only a marginal solution to the problem," says Brian Carpenter, chair of the Internet Architecture Board and program director for 'Net standards and technology at IBM. "The move delays running out of Internet addresses by so many days or weeks or months, but it's not a fundamental fix."

Nonetheless, some observers say that encouraging organizations with large blocks of unused Internet address space — such as Stanford, the Massachusetts Institute of Technology, Michigan State University, Xerox and Lucent — to return unused portions is a sensible short-term strategy.

"One solution is for people to voluntarily return address space if they don't have a requirement for it," says Kim Hubbard, president of the American Registry for Internet Numbers (ARIN). "It's expensive to renumber your network,



## The Scoop

The news behind the news

### THE ABCs OF INTERNET ADDRESSING

**T**here are three classes of address space used with IPv4, the current version of IP:

- Class A networks are commonly referred to as "slash-eight" networks because they use an eight-bit network prefix. Each Class A network can support 16.7 million computers. There are 128 Class A networks. About half of all possible IPv4 addresses — more than 2.1 billion — reside within Class A. Class A holders include U.S. military agencies, research institutions involved in creating the Internet and large corporations that were smart enough to get in on the Internet boom early.

- Class B networks are called "slash-sixteens" because they have a 16-bit network prefix. Each Class B network can support up to 65,534 hosts. There are 16,000 Class B networks. A quarter of the IPv4 address space — representing more than one billion addresses — reside in Class B. Most Class B holders are large network customers and ISPs.

- Class C networks are called "slash-twenty-fours" because they have a 24-bit network prefix. Each Class C network can support 254 hosts. There are two million Class C networks. The entire Class C space contains 536 million addresses, representing about an eighth of the total IPv4 address space. Most Class C holders are ISPs and midsize businesses.

Two additional classes exist: Class D for IP Multicast traffic and Class E for experimentation.

In the early 1990s, the Internet engineering community realized that these classes were not an efficient means of doling out IPv4 addresses. Class A blocks were larger than any organization could possibly use. Most enterprise customers required an address space that fell between Classes B and C.

As a result, the community developed a routing technique called Classless Inter-Domain Routing (CIDR), which supports arbitrarily sized blocks of network addresses rather than the standardized blocks used by Classes A, B and C. Unused portions of all three original classes can be reassigned as CIDR blocks of varying sizes.

but Stanford is doing that right now. . . . Some organizations are willing to make the effort."

How best to allocate precious Internet address space has been debated for years, but the issue flared up again last month when a simple question about how much address space is left sparked an exchange of hundreds of e-mails on the Internet Engineering Task Force's (IETF) electronic mailing list.

The debate stems from the fact that the current version of IP — IPv4 — uses 32-bit addresses. This means IPv4 can theoretically accommodate four billion addresses. But because of IPv4 design shortcomings and limits in the routing

tables, only a fraction of possible IPv4 addresses can actually be used. Estimates of how many addresses IPv4 can handle range from 150 million to one billion.

"People have to realize that the four billion addresses that IPv4 officially provides doesn't mean you can run four billion computers on the Internet," Carpenter says. "My belief is that it is very, very hard to push the density above about 160 million addresses."

Currently, a little more than half of all possible IPv4 addresses — or two billion addresses — have been assigned to ISPs, corporations and government agencies. But only an estimated 69 million addresses

### Addresses in use by class

The following is a breakdown of IPv4 address allocation and use by address class:

**Class A IPv4 addresses**

**Total possible addresses:** 2.1 billion\*

**Number assigned:** 805 million

**Number in use:** 8.3 million



**Class B IPv4 addresses**

**Total possible addresses:** 1 billion\*

**Number assigned:** 754.3 million

**Number in use:** 30.6 million



**Class C IPv4 addresses**

**Total possible addresses:** 536 million\*

**Number assigned:** 369.4 million

**Number in use:** 24.2 million



\* Numbers represent theoretical maximums; experts say useable supplies are smaller.

SOURCE: TELCORDIA TECHNOLOGIES, MORRISTOWN, N.J.

At the same time, the Internet engineering community began recommending that organizations without enough IPv4 addresses should create private Internet addresses. Using a technique called network address translation (NAT), an organization can assign a single public IPv4 address to multiple private Internet addresses. Under this scenario, IPv4 addresses are retained for host computers that require external communications with the Internet. NAT technology, however, makes it harder to deploy certain network applications and security mechanisms that require end-to-end addressing.

— Carolyn Duffy Marsan

are actually in use (see graphic, page 106).

Even though there are millions of unused IPv4 addresses, the Internet registries have strict conservation policies that make it difficult for corporations to justify receiving sizable blocks of address space. The registries have restrictive policies in place as they await the deployment of IPv6. With its 128-bit addresses, IPv6 provides a virtually infinite number of addresses.

"I think the situation has gotten better than it was a few years ago" because of the registries' conservation policies, ARIN's Hubbard says. "There was a point where we were concerned that we would run

out of space before IPv6 was available. That's why we created policies to slow down the rate of allocations."

Until IPv6 rolls out over the next few years, Internet policymakers are stuck in the awkward position of bemoaning the shortage of 'Net addresses while sitting on a huge stockpile of unassigned numbers. But they worry space will quickly run out if they liberalize allocation policies.

"For new companies trying to get on the Internet, the address shortage is real," Carpenter says. "ISPs will only give out a block of 16 addresses or so to new customers." This situation forces companies to use

See **IPv4**, page 106



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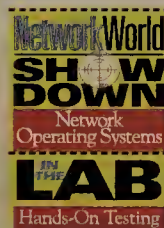


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# F5 bolsters traffic-control features of load-balancing box

Company's BIG/ip box gets quality-of-service, device failover and improved security options.

BY DENI CONNOR

Network managers will be able to guarantee availability, fine-tune access and increase manageability with load-balancing hardware and software F5 Networks will ship later this quarter, the company says.

F5's BIG/ip Controller, a load-balancing device that sits between the router and Web server, will be enhanced to include "active-active" redundancy, intelligent traffic control, transparent device persistence and an improved management interface.

BIG/ip's active-active redundancy lets operating con-

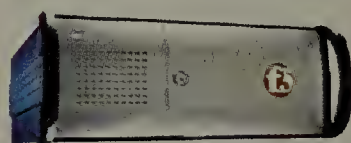
trollers take over for each other in the event of failure and allows both controllers to be active at the same time, thus increasing availability.

"We've been asking F5 for that feature just because it doubles the throughput we can get," says Dwight Gibbs, chief techie geek for The Motley Fool in Alexandria, Va., which today has two BIG/ip controllers operating in active-passive mode.

The product can also identify specific traffic, based on URLs, cookies or client source address, and send that traffic to a server that can best handle the request. "For instance, we can look at the

## New features of F5's BIG/ip:

- Intelligent traffic control increases quality of service by identifying specific traffic by URL, cookies or source address.
- Source and destination processing.
- Increased security by locking down any port desired.
- Improved F5 configuration utility.



value in a cookie and based on it, route our best customers to the fastest and most available servers," Gibbs

says. "We can route more advanced users to different home pages based on the value of certain traffic."

## Spread the wealth

In addition, BIG/ip Controller now supports transparent device persistence. If, for example, BIG/ip accepts traffic from more than one router, it can return data back through the same router the traffic originated from. This option is useful in spreading the load among devices or ensuring that connections go back through the same proxy, cache, firewall or virtual private network in connection-oriented environments.

Server load-balancing is a "white-hot" market, says Mark Leary, an analyst with International Data Group in Framingham, Mass.

"Server front-ending with load balancers is the No. 1 priority for a lot of IT managers. Features that improve reliability and allow for better decision-making in switch/router products are key determinants of success."

"If our BIG/ip Controllers were not working correctly, our whole site would be down," Gibbs says. "If they died, we'd really be in bad shape."

F5 declined to provide pricing information. ■

IPv4,  
continued from page 104

network address translation, a technique for supporting multiple private Internet addresses with a single public Internet address, to cope with their meager allotments.

Many big U.S. firms, however, have more than enough addresses. "The large companies and universities all got their address space years ago when the policies were much less conservative," Carpenter says. "We're not hurting yet."

Stanford is one of the organizations with an abundance of address space, including a Class A block of 16 million Internet addresses and four Class B blocks, each of which supports more than 65,000 addresses (see story, page 104). Stanford is migrating all the computers on its network to the Class B space and will return the Class A block to ARIN.

"We certainly didn't need the Class A block," says Ron Roberts, architect and operations manager for the Stanford University Network (SUNet). "While it was prestigious and emblematic of Stanford's early involvement with the Internet, there was no way to really make a case for it... In the spirit of good Internet citizenship, we're relinquishing our squatter's right to Class A."

Stanford's network services

staff had to convince university leaders that renumbering the network was the right thing to do. Then the staff embarked on a mission to educate the university's user community about making the change. This was a challenge because the SUNet team doesn't manage the hosts on

DHCP obtains IP addresses, when needed, for clients from local servers.

So far, about 20,000 of the university's systems have been renumbered, and the rest will be done by April 30.

"It's a lot of work," Stanford's Kohn admits. "But it's doable work. You have to be very orga-

Stanford's gesture is likely to put pressure on the holdouts.

"We don't have any plans to renumber our network," says Richard Moore, division manager for network services at Michigan State University. Moore says the university is using a fraction of the Class A space that was originally

numbers around our space."

Jeffrey Schiller, network manager at MIT and a member of the IETF leadership, says he has no plans to renumber the 80,000 machines on the university's network.

"There is not an address shortage," Schiller says. "There's an artificial shortage because the registries are being very stingy about giving out addresses."

Schiller says that MIT doesn't want to spend the money to renumber its network, particularly if the arrival of IPv6 will make the effort meaningless.

"We keep our eye on the amount of space that's being allocated," Schiller says. "If there is a real shortage of address space, we'll see it coming... Then we'll incrementally move to part of our Class A space. But we're not going to do it pre-emptively because we don't see the need."

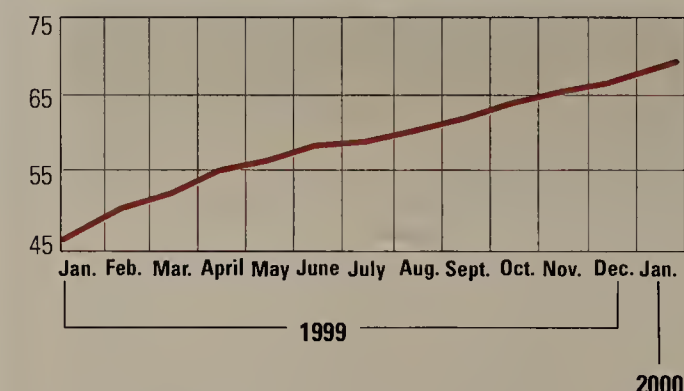
Ironically, even Stanford officials question whether their Class A space is needed immediately.

"I'm not personally one of those people who thinks there's an IPv4 address shortage," Kohn admits. "I think our efforts will make a difference, but I don't think there's a crisis." ■

## The state of IPv4 addresses

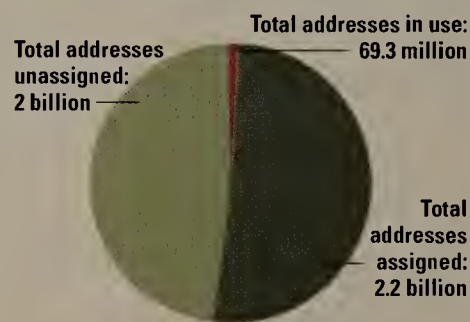
While the number of IPv4 addresses in use grew sharply last year...

Number of IPv4 addresses in use in the past 12 months (in millions)



SOURCE: TELCORIOA TECHNOLOGIES, MORRISTOWN, N.J.

... the total number in use is still a sliver of the total number available.



(although experts say only a billion at most are used for practical purposes.)

the university's local networks, only the backbone routers and network devices. So they had to teach LAN administrators and end users how to reconfigure the Internet addresses on their machines. For users who had not yet adopted the Dynamic Host Configuration Protocol, this task was particularly time-consuming.

nized and very planned... It's gone well, I think."

In the mid-1990s, several other Class A holders — including Computer Sciences Corp., Electronic Data Systems and the U.S. Department of Defense — returned some of their unused Internet address space. Stanford, however, is the first organization to return an entire Class A block. Many observers say

allocated to Merit, a consortium of Michigan universities and colleges.

The other Merit members have renumbered their networks and migrated to Class B address space. "Why should we put our users and staff through all that bloody change?" Moore says. "With the latest router technology, I think they could just assign

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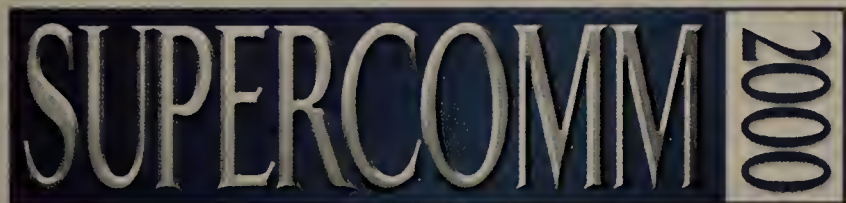
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# Cisco snaps up firms, gains VPN edge

*Company's acquisition of Altiga Networks and Compatible Systems will enhance VPN offerings.*

BY JIM DUFFY

Looking to bolster its virtual private network (VPN) offerings, Cisco last week announced definitive agreements to acquire privately held Altiga Networks in Franklin, Mass., and Compatible Systems in Boulder, Colo., for \$567 million in stock.

Altiga develops VPN systems for remote access applications, and Compatible makes standards-based VPN products for service provider networks.

From Altiga, Cisco will gain an integrated VPN client, remote access gateway and management software for enterprise-edge applications. Compatible will contribute ser-

vice-provider-class IP Security (IPSec)-based VPN service platforms.

Until now, Cisco had been strong in site-to-site VPN offerings — the company sold between \$200 million and \$250 million in products in 1999 — but the firm was behind in remote access VPN sales, acknowledges Richard Palmer, vice president of Cisco's Enterprise WAN business unit. Altiga now gives Cisco a formidable product to sell to remote site VPNs, he says.

The Compatible acquisition gives Cisco a powerful IPSec VPN platform to sell to service providers, a market that's just emerging, Palmer says.

Analysts reacted positively to Cisco's purchases. Ron Westfall, an analyst at Current Analysis in Sterling, Va., believes both companies fill critical product gaps in Cisco's VPN portfolio.

"Cisco needed to acquire Altiga and Compatible to establish a firm foothold in the overall VPN market before major VPN rivals such as Nortel Networks, Lucent and Check Point Software can establish market dominance during the early maturation stage of the VPN market," Westfall wrote in a report on the acquisitions.

However, Westfall believes Cisco may not be getting full value for the \$567 million price tag of acquiring Altiga and Compatible, as both companies

have product lines that overlap in the carrier and enterprise markets.

Cisco has already decided to phase out or discontinue further development of overlapping VPN product lines such as Altiga's carrier-class S100/S200 series, and thus the company has purchased technology it will not use, Westfall says. Moreover, Cisco inherits Compatible's enterprise VPN customer base, although Compatible's enterprise VPN technology is not in Cisco's long-term VPN plans, he adds.

"Such customers may feel like they are twisting in the wind as Cisco consolidates its enterprise VPN customer premises equipment portfolio

around the Altiga C series and 7000 routing series," Westfall says.

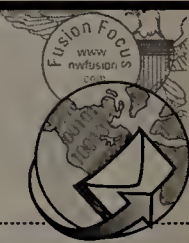
Palmer acknowledges that Cisco will emphasize the Compatible products for the service provider market, and Cisco's and Altiga's offerings for site-to-site and remote access VPN requirements, respectively.

Altiga was founded in 1998. Its 76 employees will be led by Altiga CEO Mark Freitas and will become part of Cisco's Enterprise line of business.

Compatible was founded in 1988. Its 68 employees will be led by Compatible CEO Matt McConnell and will become part of Cisco's Service Provider line of business. ■

## VPNs

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**ComNet,**  
continued from page 1

the Catalyst 4006, a six-slot version and second member of the year-old Catalyst 4000 line, sources say. Currently, the Catalyst 4000 line consists of the three-slot Catalyst 4003, which offers 24G bit/sec of switching bandwidth and supports up to 96 ports of 10/100M bit/sec Ethernet or 36 ports of Gigabit Ethernet.

The Catalyst 4006 scales up to 60G bit/sec and sports up to 240 10/100 ports and

90 Gigabit Ethernet ports. The switch is targeted at enterprise wiring closets requiring high levels of quality of service (QoS), but it can also be used in small and midsize enterprise core backbones.

Layer 3 services are enabled through a new 32-port 10/100 Layer 3 services engine line card with two Gigabit Ethernet uplinks. This card is compatible with the 4006 and 4003 chassis and supervisor switch engine modules. The Layer 3 services engine enables all ports on the

switch to run IP Multicast services at wire speed, sources say. It also delivers QoS using multiple queues with scheduling and type-of-service/class-of-service field marking.

The 4006 can be populated with up to five Layer 3 services engine line cards, sources say.

Cisco declined to comment on the 4006 and other announcements expected at ComNet. But sources say Cisco will also roll out a 48-port 10/100 telco line card and a 24-port 100Base FX line card for the Catalyst 4000 switches. These cards are designed to give customers more connectivity options, sources say.

For the Catalyst 5000, Cisco is expected to unveil two new modules: a two-port QoS-enabled gigabit interface converter (GBIC) uplink and a 24-port 100BaseFX single-mode fiber MTRJ switching module. The new GBIC uplink module delivers QoS capabilities such as classification, prioritization and scheduling.

The 24-port 100BaseFX single-mode fiber MTRJ switching module enables service providers to build metropolitan-area networks with sophisticated QoS classification, sources say. With this module, traffic can be priori-

tized according to ports and IP addresses.

The Catalyst 4006, supervisor module, Telco and 100BaseFX modules are available now. The Layer 3 services line card will be avail-



**Cabletron is enabling customers to turn the SmartSwitch 6000 into a Layer 3 switch.**

able within 60 days. The list price for a Catalyst 4006, supervisor module, power supplies and 240 Fast Ethernet and two Gigabit Ethernet ports is less than \$150 per port.

## Cabletron offers upgrades

Cabletron customers also now have the opportunity to add more sophisticated features to their existing switches with a significant upgrade. Cabletron's Advanced Router Module (ARM) for the SmartSwitch 6000 adds Layer 3 capabilities to the switch so users can prepare for new applications such as Enterprise Resource Planning and

packetized voice.

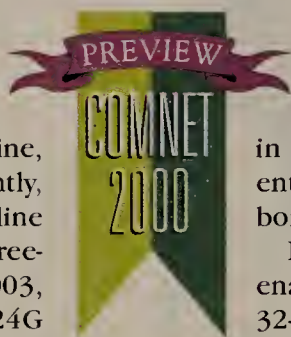
The ARM is essentially a "SmartSwitch Router 2000 on a stick," says Cabletron product marketing manager Brady Cole. "It basically turns the 6000 into a Layer 3 switch."

Cabletron's SmartSwitch Router 2000 is a router for small and midsize enterprises and branch offices. ARM brings the same features of the SSR 2000 to the SmartSwitch 6000: an 8G bit/sec switching fabric capable of forwarding 6 million packet/sec, support for 16,000 routes, 128,000 application flows and 180,000 media access control addresses, and up to 2,000 filters.

ARM can also recognize Layer 4 TCP and UDP port number information at wire speed, Cole says, which is important for providing security, allocating QoS, collecting statistics and performing accounting.

ARM supports eight-port 10/100Base-TX and 100Base-FX interfaces; two-port 1000Base-SX/LX and single-port 1000Base-LLX line cards; and a dual-port T-1 WAN module. It costs \$9,000 and will be available in February.

Cisco: [www.cisco.com](http://www.cisco.com);  
Cabletron: [www.cabletron.com](http://www.cabletron.com)



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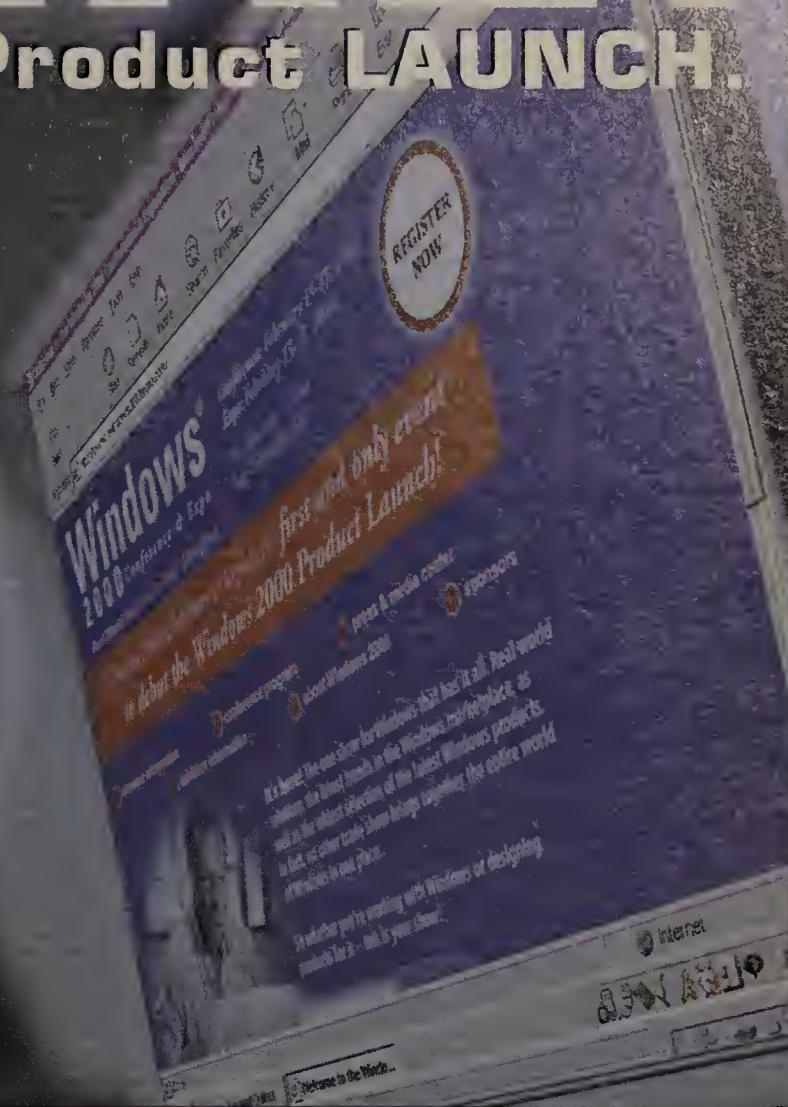
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## The winner and weird tales

An old coworker of mine used to work for Unisys as a programmer. They had a new remote-access box attached to their mainframe, and shortly thereafter, began having problems with the mainframe rebooting. Tech support removed the remote access box, but no fix.

This went on for several weeks, until someone realized the mainframe seemed to reboot every time they got a support call from another building. This didn't make any sense until another tech noticed that one of their phones in the computer room was missing. They found the phone under the computer room's raised floor, right in the middle of a coil of wire connecting the mainframe to the remote

access box. It seems somehow when the phone rang, the coil was picking up interference and causing the mainframe to reboot. Talk about your tech support calls.

— *The winning entry in the Backspin Tall Tales competition (see NW, Nov. 8, 1999, page 70) was submitted*

*by Will Kerr, who will receive an antique Apple Newton. Congratulations, Will. I hope you have a boat, 'cause now you've got an anchor.*

*Thanks to the runners-up: John Garner, Ryan Echlin, Tracey Hetzer, Tom Borton, Ben Hammond, Robert Bellman, Ron Swift, Whitbam Reeve, Augustus Carter, Robert Prohl, Kent McStrain, Brian S. Eller and Randy Winn (send a message to me with the subject "Runnersup" to see the rest).*

So what's hot? Surely it has to be Microsoft's announcement that Chairman Bill will no longer be CEO, and his incredibly valuable shoes will be filled by Obergruppenfuhrer Ballmer.

What do we make of this, here at the Gibbs Institute of Subterfuge and Misdirection? We think it's all a ploy to line up the politics for the forthcoming breakup of

Microsoft. Just think about it: Under the guise of having had enough of fighting with the government, Bill says that he's going to transmogrify into Microsoft's chief software architect. Sure, like he's suddenly had enough of being at the helm.

The way we see it, Bill will get enmeshed in the applications division. When the ax falls, he'll be the logical choice to take over the new company. Obviously, Ballmer takes over the operating systems company. While the two entities would be effectively separate, don't for a second think that they wouldn't share a common strategic vision.

It wouldn't matter that the two companies won't be able to collude on APIs and other mechanisms to lock up the market. The shared goals about how the market — and not the technology — should be driven will be enough to make the companies increase and hold their share in their respective domains.

Will the Feds turn around and go through the whole antitrust exercise again? You bet. And the two companies will turn into four, all piloted by Gates/Ballmer clones. Then the government will go back even sooner the next time, and we'll get 16 companies. We calculate that by the 27th iteration, every household in the U.S. will be in charge of some small portion of Microsoft.

How long will this take? Well, it has taken about two years for the first breakup to happen, so if the government returns to the battle in half the time for each iteration, your family will be in charge of a piece of Microsoft in about four years.

Now Microsoft is worth about \$600 billion. Let's assume that the market cap increases in line with the share price (about double every year). So in four years, all 100,000,000 Baby Bills will be worth an average of something around \$30 trillion. That will make your family's Microsoft company worth around \$96,000. And you thought Mr. Kerr's story was odd.

*Weird tales to mvcolumb@gibbs.com.*



MARK  
GIBBS



The latest on the  
Internet/intranet industry

If you had a hard time convincing the boss to pony up for that trip to ComNet 2000 this week in Washington, D.C., chances are you won't be going on a Geek Cruise anytime soon.

But filing the travel request might be worth a chuckle . . . and, well, you never know.

Docked at [www.geekcruises.com](http://www.geekcruises.com), start-up **Geek Cruises, Inc.** of Palo Alto is the brainchild of **Neil Bauman**, "captain and CEO." The idea is simple enough: Geek Cruises reserves a few hundred cabins on a handful of **Holland America's** regularly scheduled vacation tours to Alaska and the Caribbean. Then Bauman enlists a lineup of expert speakers on topics such as Perl, Java, XML and databases. Voila: You've got a series of floating technical conferences, provided you can find enough geeks (easy) and enough gullible bosses (not so easy) to fill those cabins.

Bauman claims he has 75 commitments for the first cruise — a "Perl Whirl" to Alaska Memorial Day weekend. That's enough for him to break even and keep the cruise line happy, he says, with plenty of calendar time remaining for additional bookings.

So if you want to take a flier — just to see if the brass is awake — you might want to prepare by reading Geek Cruises' "Convincing The Boss" tips page. Here's the first entry:

"Don't tell management you want to go on a cruise: Tell them this is a 'conference.' If necessary, tell them the 'conference' is in Alaska, but simultaneously emphasize the quality of the talks and the fact that the speakers are well-known authors."

Here's my advice should that tactic work: Be sure to have plenty of resumes on hand before boarding because you'll be job hunting once the cruise is over.

But think about it. Is Geek Cruises really that absurd? After all, corporations routinely rubber-stamp convention travel that sends employees on all-expenses-paid trips to the gambling and prostitution capital of America.

"As more bosses start thinking about [the cruise alternative] logically and practically, they're going to see the advantages," Bauman insists.

We should live so long.

**Call me selfish**, but there is no "broadband revolution" until high-speed Internet access gets to my house. Of course, *Network World* might send me on a Caribbean cruise before that happens.

We do not live in the sticks. Yet our local cable company says we shouldn't expect high-speed service until the fourth quarter . . . of 2001. **Bell Atlantic** says DSL "should be available" in about six months, a promise I wouldn't believe if **James Earl Jones** walked up to my front porch and insisted it was so.

According to **International Data Corp.**, only 1.9 million out of 36 million online households in the U.S. had high-speed connections as of December. That's one-half of 1%. The IDC researchers predict those numbers will grow to 20 million out of 65 million wired homes by 2003, although what that means for my particular street remains frustratingly unclear.

Which is why a press release from **iSKY**, a fledgling broadband satellite service provider, caught my attention last week. The company landed a \$50-million round of venture capital from **Kleiner Perkins Caufield & Byers**, **TV Guide** and **Liberty Media**. The money is but a fraction of the \$750 million iSKY intends to spend in order to provide two-way satellite service to broadband-poor customers such as yours truly.

So when do I get to give iSKY my business?

Well, the company says it will start beaming to customers sometime late next year — in other words, long after Mr. Jones has taught me not to question his word, and perhaps even after my pokey cable company comes across.

Whatever happened to Internet time?

Condolences, gossip and Internet news tips to [buzz@nww.com](mailto:buzz@nww.com).



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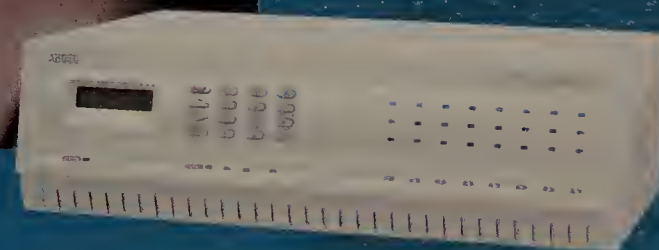
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